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Express Mail Label No.: EL928105062US

Date of Deposit: July 14, 2004

Atty. Docket No.: 8822/2022

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Bachmann, et al.  
Serial No.: 10/762,107  
Filed: January 21, 2004  
Entitled: Farnesyl Dibenzodiazepinone,  
Processes for Its Production and its Use  
as a Pharmaceutical

Examiner: Not yet assigned

Group Art Unit: 1624

Conf. No.: 4987

Mail Stop Missing Parts  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

PETITION UNDER 37 C.F.R. §1.182

Applicants hereby petition under 37 C.F.R. §1.182 that the above-noted application be recognized as complete as of its filing date of January 21, 2004.

In the Notice to File Missing Parts mailed May 14, 2004 it was stated that Figure 20, referred to in the specification, was **omitted** among the materials filed on January 21, 2004.

Applicants submit that Figure 20 was in fact submitted with the application. Figure 20 is the Nucleic Acid Sequence Listing, provided in both paper and computer-readable form as noted in the Transmittal Letter that accompanied the file. Copies of the following are submitted herewith in proof of timely deposit of Figure 20:

A) the Transmittal Letter, showing entry (3) as “(3) One Hundred and Fourty (sic) Seven (147) sheets of Informal Drawings of Figs 1-20, *including Figure 20 as the Paper Copy of the Sequence Listing*” (emphasis added);

B) the paper copy of the Sequence Listing itself; and

C) the date-stamped return postcard acknowledging receipt of the “Paper copy of Sequence Listing (as figure 20).”

Applicants submit that the evidence provided herein is sufficient to establish that Figure 20 was timely submitted upon filing of the application. The Commissioner is authorized to

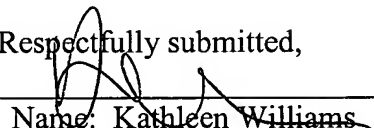
Serial No.: 10/762,107

charge the applicable \$130.00 petition fee under 37 C.F.R. 1.17(h), and any other necessary fees to Deposit Account No. 16-0085, Reference 8822/2022.

Applicants respectfully request acknowledgment that the application was complete as of the January 21, 2004 filing date.

Date: July 14, 2004

Respectfully submitted,

  
Name: Kathleen Williams

Registration No.: 34,380

Customer No.: 29933

Palmer & Dodge LLP

111 Huntington Avenue

Boston, MA 02199-7613

Tel: 617-239-0100



Atty. Docket No.: 8822/2022

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Bachmann, et al.  
Serial No.: Not yet assigned  
Filed: January 21, 2004  
Entitled: Farnesyl Dibenzodiazepinone, Processes for  
Its Production and its Use as a  
Pharmaceutical

COPY

**CERTIFICATE OF MAILING UNDER 37 CFR 1.10**

I hereby certify that the paper (and any paper or fee referred to as being enclosed) is being deposited with the United States Postal Service using Express Mail to Addressee Service, under 37 C.F.R. Section 1.10, **Express** Mail Label No. EL932932039US on this date, **January 21, 2004**, postage prepaid, in an envelope addressed to Mail Stop Patent Application, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Mary Wilson

Name of Person Mailing Paper

Signature of Person Mailing Paper

**Mail Stop Patent Application**  
**Commissioner for Patents**  
**P.O. Box 1450**  
**Alexandria, VA 22313-1450**

**TRANSMITTAL LETTER**

Enclosed for filing in the above-identified patent application, please find the following documents:

1. New Patent Application Transmittal;
2. Patent Application, (142 pages);
3. One Hundred and Fourty Seven (147) sheets of Informal Drawings of Figs 1-20, including Figure 20 as the Paper Copy of the Sequence Listing;
4. Computer Readable Copy of the Sequence Listing;
5. Statement Under 37 C.F.R. §1.821(f) and (g);
6. Application Data Sheet;
7. Preliminary Amendment; and
8. Return Post Card.

Pursuant to 37 C.F.R. § 1.27, Applicant claims small entity status.

The Commissioner for Patents is hereby authorized to charge all fees to Deposit Account No. 16-0085, Reference 8822/2022. A duplicate of this transmittal letter is enclosed for this purpose.

Respectfully submitted,

Date: January 21, 2004



Name: Barbara Gyure

Registration No.: 34,614

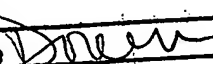
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Palmer & Dodge LLP

111 Huntington Avenue

Boston, MA 02199-7613

Tel: 617-239-0100

Docketed  
Response Due   
Statutory Period  
Palmer & Dodge LLP  
Patent Department



PATENT



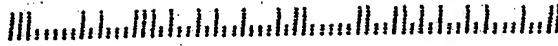
Attn: Kathleen Williams  
Palmer & Dodge LLP  
111 Huntington Avenue  
Boston, MA 02199-7613

22151 U.S. PTO  
10/762107



012004

2004-01-28  
05/05/04  
05/05/04



Serial No. Not yet assigned File No. 8822/2002 By: Kmw (m65)  
Applicant(s): Bachmann, et al.  
Title: Farnesyl Dibenzodiazepine, Processes for its Production

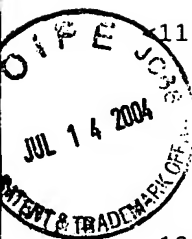
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| <p><input checked="" type="checkbox"/> Cert. of Mailing by Express Mail (37 CFR 1.10)<br/>Express Mail Label No. <u>81932932039</u><br/><input type="checkbox"/> Cert. of Mailing under 37 CFR 1.8(a)<br/><input checked="" type="checkbox"/> Patent Application (<u>142</u> total pgs)<br/>    <input type="checkbox"/> Provisional or <input checked="" type="checkbox"/> Non-Provisional<br/>    (<u>12</u> pgs) Specification (<u>1</u> pgs) Abstract,<br/>    (<u>20</u> pgs) Claims (<u>73</u> # claims)<br/><input checked="" type="checkbox"/> New Patent Application Transmittal<br/><input checked="" type="checkbox"/> Provisional Patent Application Cover Sheet<br/><input checked="" type="checkbox"/> Declaration and Power of Attorney<br/><input checked="" type="checkbox"/> Application Data Sheet<br/><input checked="" type="checkbox"/> Drawings <u>147</u> Sheet(s) (FIGS. <u>1</u>)<br/>    <input type="checkbox"/> Formal or <input checked="" type="checkbox"/> Informal<br/><input type="checkbox"/> Assignment of _____<br/><input type="checkbox"/> Recordation Cover Sheet Form PTO-1595<br/><input type="checkbox"/> Information Disclosure Statement<br/><input type="checkbox"/> Form PTO 1449 and Copies of Cited References</p> | <p>Response to Notice to File Missing Parts<br/>Copy of Part 2 of NFMP<br/>Diskette Containing Nucleotide and/or<br/>Amino Acid Sequence Listing<br/>Priority Document(s) # _____<br/>Amendment/Response<br/>Petition for Extension of Time (x2)<br/>Check in the amount of _____<br/>Cher'k # _____<br/>Transmittal of Formal Drawings<br/>Motion/Opposition/Reply<br/>Request for Cont'd Examination (RCE)<br/>Notice of Appeal<br/>Appeal Brief (x3)<br/>Issue Fee Transmittal<br/>Transmittal Letter (x2)<br/><u>(as figure 20)</u></p> |
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☒ Other Paper Copy of Sequence Listing, Statement Under  
37 C.F.R. § 1.825(f) & (g)

MAILED January 21, 2004

SEQUENCE LISTING



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Farnet, Chris  
McAlpine, James  
Zazopoulos, Emmanuel  
Bachmann, Brian  
Pirae, Mahmood

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<151> 2003-01-21

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<151> 2003-08-07

<150> USSN 60/518,286

<151> 2003-11-10

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 <212> PRT  
 <213> Micromonospora sp. strain 046-EC011

<400> 2

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&lt;213&gt; Micromonospora sp. strain 046-EC011

&lt;400&gt; 3

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<213> Micromonospora sp. strain 046-EC011

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His Leu Arg Lys Ile Tyr Arg Lys Leu Gly Phe Asn Thr Arg Ala Glu 645 650 655		
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<213> Micromonospora sp. strain 046-ECO11

<400> 6

Met Val Ile Met Asn Arg Met Ala Gly Arg Gly Gln Glu Leu Ser Ser  
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Leu Gly Glu Leu Leu Asp Ala Thr Met Arg Gly Ser Gly Gly Cys Val  
20 25 30  
Val Val Asp Gly Pro Phe Gly Ile Gly Lys Thr His Leu Leu Lys Val  
35 40 45  
Thr Gly Leu Glu Ala Ala Ala Arg Gly Leu Thr Val Val Ala Gly Arg  
50 55 60  
Ala Ser Val Thr Asp Gln Pro Val Pro Val His Leu Leu Val Asn Phe  
65 70 75 80  
Leu Arg His Ala Met Pro Gly Glu Ala Ala Val Glu Gln Leu Ala Leu  
85 90 95  
Pro Gly Ala Asn Pro Phe Trp Leu Ile Asp Arg Val Gly Asp Leu Val  
100 105 110  
Glu Val Ala Ala Arg Arg Arg Pro Leu Val Val Ala Leu Asp Asp Ala  
115 120 125  
Gln Arg Ile Asp Asp Val Ser Ala Leu Ala Leu Arg Gly Leu Val Pro  
130 135 140  
Arg Leu Ala Ser Ser Pro Val Leu Trp Leu Leu Ala Arg Arg Pro Val  
145 150 155 160  
Ala Ala Gly Ser Ile Ala Gln His Ala Val Asp Trp Leu Ala Glu His  
165 170 175  
Val Ala Val Arg Val Arg Leu Arg Glu Pro Gly Glu Glu Ala Val Ala  
180 185 190  
Asp Leu Cys Ala Gly Ile Leu Gly Ala Arg Pro Asp Ala Ser Val Leu  
195 200 205  
Arg Trp Ala Ala Arg Cys Gly Gly Asn Pro Lys Val Met Glu Ile Val  
210 215 220  
Phe Ser Ala Phe Ile Lys Ala Gly Gln Met Ile Ile Val Asp Gly Ala  
225 230 235 240  
Ala Ser Val Val Ser Asp Glu Leu Pro Asp Gly Val Leu Ala Ala Val  
245 250 255  
Arg Gly Leu Leu Glu Glu Leu Pro Pro Pro Leu Arg Arg Leu Leu Ala  
260 265 270  
Ala Gly Gly Arg Leu Gly His Thr Phe Pro Val Asp Arg Val Thr Gly



275					280					285					
Leu	Leu	Asp	Gly	Ser	Ala	Ala	Asp	Val	Ser	Ala	Ala	Ile	Asp	Glu	Ala
290					295					300					
Val	Arg	Val	Gly	Leu	Ile	Arg	Arg	Asp	Gly	Ala	Glu	Leu	Thr	Phe	Ala
305				310					315						320
His	Pro	Val	Leu	Gly	Glu	Ala	Leu	Arg	His	Ala	Ala	Tyr	Pro	Glu	Pro
			325					330					335		
Glu	Arg	Ala	Glu	Pro	Gly	Ser	Ala	Pro	Ala	Pro	Ala	Ala	Gly	Asp	Pro
			340					345					350		
Val	Arg	Arg	Gly	Arg	Pro	Asp	Pro	Arg	Pro	Gly	Thr	Pro	His	Ser	Pro
			355				360					365			
Ala	Gly	Val	Arg	Val	Thr	Arg	Ser	Ala	Pro	Asp	Ala	Ala	Thr	Pro	Ala
	370					375					380				
Ala	Thr	Ala	Gly	Pro	Arg	Ser	Gly	Arg	Cys	Gly	Cys	Asp	Asp	Val	Ala
385				390					395						400
Ala	Ala	Ala	Val	Ser	His	Leu	Glu	Asn	Gly	Ser	Ala	Glu	Ala	Pro	Arg
			405					410						415	
Ala	Leu	Ala	Arg	Ala	Leu	Arg	Leu	Leu	Ala	Gly	Ala	Gly	Arg	Ala	Ala
			420				425						430		
Glu	Ala	Gly	Arg	Leu	Ala	Glu	Val	Met	Leu	Arg	Arg	Asp	Leu	Ala	Ala
	435					440					445				
Asp	Val	Glu	Ala	Gln	Leu	Val	Leu	Glu	Leu	Gly	His	Gly	Met	Arg	Ala
	450					455					460				
Ala	Gly	Ser	His	Arg	Leu	Ala	Ala	Gly	Phe	Leu	Arg	Arg	Thr	Gln	Ala
465				470					475					480	
Arg	His	Asp	Val	Cys	Glu	Leu	Asp	Arg	Ala	Lys	Leu	Asp	Arg	Ala	Leu
			485					490					495		
Ala	Asp	Thr	Thr	Lys	His	Leu	Gly	Gly	Ala	Ser	Ser	Ala	Glu	Leu	Glu
			500				505						510		
Pro	Arg	His	Gln	Ser	Pro	Gly	Cys	Ala	Pro	Gly	Arg	Arg	Pro	Leu	Trp
		515				520					525				
Thr	Trp	Leu	Val	Arg	Ala	Leu	Gly	Ala	Ala	Asp	Gln	Leu	Asp	Glu	Ala
530						535					540				
Gln	Ala	Val	Leu	Asp	Thr	Val	Arg	Pro	Leu	Ala	Gln	Glu	Pro	Ser	His
545				550					555					560	
Thr	Gly	Ser	Glu	Ser	Leu	Trp	Arg	Gly	His	Arg	Ala	Glu	Leu	Leu	Ala
			565				570						575		
Ala	Ala	Gly	Arg	Leu	Asp	Glu	Ala	Arg	Ala	Glu	Ala	Glu	Ala	Ala	Leu

580					585					590						
Arg	Ala	Ala	Asp	His	Ser	Arg	Pro	Gly	Asp	Cys	Val	Pro	Ala	Arg	Leu	
595					600					605						
Val	Leu	Ala	His	Leu	Gly	Val	His	His	Gly	Asp	Leu	Ala	Thr	Ala	Ser	
610					615					620						
Asp	Gln	Leu	Arg	Ala	Ala	Glu	Arg	Leu	Ala	Ser	Ala	Asp	Asp	Ser	Ala	
625					630					635					640	
Arg	Met	Asp	Trp	Ala	Leu	Ala	Arg	Phe	His	Ala	Ala	Ser	Gly	Arg	Pro	
645					650					655						
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660					665					670						
Asp	Pro	Leu	Leu	Phe	Thr	Glu	Ala	Pro	Ala	Ala	Ala	Ala	Thr	Leu	Val	
675					680					685						
Arg	Gln	Ala	Arg	Arg	Ala	Gly	Leu	Asp	Ala	Glu	Ala	Glu	Arg	Ala	Val	
690					695					700						
Glu	Val	Ala	Arg	Arg	Val	Ala	Arg	Gly	Asn	Pro	Phe	Val	Gln	Ser	Leu	
705					710					715					720	
Ala	Ala	Ala	Ala	Glu	His	Ala	Ala	Gly	Leu	Leu	Arg	Asp	Asp	Pro	Ala	
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Ala	Leu	Leu	Arg	Ala	Ala	Asp	Leu	His	Arg	Leu	Ala	Gly	Arg	Thr	Leu	
740					745					750						
Ala	Ala	Ala	Gly	Ala	Val	Glu	Asp	Ala	Ala	Arg	Ser	Thr	Arg	Asp	Arg	
755					760					765						
Ala	Glu	Ala	Thr	Arg	Leu	Leu	Glu	Ala	Ala	Thr	Asp	Gly	Tyr	Arg	Glu	
770					775					780						
Cys	Gly	Ala	Arg	Arg	Asp	Leu	Glu	Arg	Val	Glu	Ala	Glu	Leu	Arg	Gly	
785					790					795					800	
Leu	Pro	Ala	His	Asn	Val	Arg	Pro	Leu	Val	Pro	Asp	Arg	Pro	Arg	Ser	
805					810					815						
Gly	Trp	Glu	Ser	Leu	Thr	Ser	Ala	Glu	Leu	Arg	Val	Val	Arg	Ala	Ile	
820					825					830						
Val	Asp	Gly	Met	Thr	Asn	Arg	Glu	Ala	Ala	Ser	Ser	Leu	Phe	Leu	Ser	
835					840					845						
Pro	His	Thr	Val	Asp	Ser	His	Leu	Arg	Arg	Val	Phe	Ser	Lys	Leu	Asp	
850					855					860						
Ile	Asn	Ser	Arg	Val	Glu	Leu	Thr	Arg	Cys	Phe	Ile	Ala	His	Glu	Ala	
865					870					875					880	
Val	Arg	Pro	Ala	Leu	Ala	Thr	Thr	Arg	Gln	Pro	Ala	Ser	Ala	Gly		

885

890

895

&lt;210&gt; 7

&lt;211&gt; 2688

&lt;212&gt; DNA

&lt;213&gt; Micromonospora sp. strain 046-EC011

&lt;400&gt; 7

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ggcaagaccc acctgctgaa ggtcacgggc ctggaggcgg cggcccgcg gctgacagt	180
gtggccgggc gggcaagcgt cacggatcag ccggtgcccg tacacctgct cgtcaacttc	240
ctgcgccacg cgatgcccg cgaagcgcg gtcgagcagc tcgccctgcc gggcgccaac	300
ccgttctggc tgatcgaccg ggtcggcgat ctggtcgagg tcgcggcgcg ccggcgccc	360
ctcgtggtcg ccctggacga cggccagcgc atcgacgacg tcagcgccct ggccctgcgc	420
gggctcgtgc cgcgcctggc gtccctgcgc gtgctctggc tgctggccc cggcccggtc	480
gccgccgggt cgatcgctca gcacgccgtc gactggctgg ccgagcacgt cgcggtacgg	540
gtacggctgc gcgagccgg cgaggaggcg gtggccgacc tgtgcgccc catcctcggc	600
gcccggccgg acgcctccgt cctgcgctgg gggcccgct gcggcgcaa cccgaaggtg	660
atggagatcg tcttcagcgc gttcatcaag gccggccaga tgatcatcgt ggacggggcg	720
gcgtcgggtg tgtccgacga gctgcccgac ggtgtcctcg ccgccgttcg cgggctgctg	780
gaggagctgc cggcccgct gcggcgccctg ctcgcgcccg gcggccggct cggccacacg	840
tttcccgctc accgggtgac gggcctgctg gacggctcgg ccgccgacgt gtccgcccg	900
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cacccgggtc tcggagaggc gcttcgccac gccgcgtacc cggaaccgga gcgtgccgag	1020
cccggatccg cgcgggcacc gggggcgggc gaccgggtcc ggcgcgggcg gccgatccg	1080
cggcccgga cgcggcactc ccccgccggc gtacgcgtca cgcgctccgc gccggacg	1140
gccacgccc cgcgacggc ggggcccgc tcgggcccgt gcgggtgcga cgacgtggcg	1200
gcagccgccc tgtccacact ggagaacgga tccgccgagg cggcacgagc actggcccgt	1260
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gggatgcggg ccgcccggcag ccaccgcctg gcggccggct tcctgcgccg gacgcaggcc	1440
cggcacgacg tgtgcgagct ggaccgcgc aagctggacc gggcgctcgc ggacaccacg	1500

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ctcgacgagg cgcaggcggt gctggacacc gtacgaccgc tggcgagga gccagtcac 1680  
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gagcgcgccg tggaggtcgc ccggcgctc gcccgggca acccgttcgt ccagtcgctg 2160  
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gcggcccga gcacccggga ccgggccgag gccacccgtc tgctcagaggc cgcgacggac 2340  
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gcggcgagtt cgctgttct gtccccgcac accgtcgaca gtcacctgcg gcgcgtcttc 2580  
tccaagctcg acatcaacag ccgggtggaa ctgaccgct gttcatcgc gcacgaggcg 2640  
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<210> 8

<211> 362

<212> PRT

<213> Micromonospora sp. strain 046-EC011

<400> 8

Met Thr Val Gly Tyr Leu Gly Thr Val Thr Asp Ser Ala Pro Val Asp  
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Ala Ala Leu Arg Asp Phe Phe Ala Glu Arg Arg Ala Glu Ala Arg Glu  
20 25 30

Leu Gly Asp Asp Phe Ala Ala Leu Val Ala Glu Leu Glu Ser Tyr Val  
35 40 45

Leu Arg Gly Gly Lys Arg Ile Arg Pro Ala Phe Ala Trp Leu Gly Trp  
 50 55 60  
 Ile Gly Ala Gly Gly Asp Pro Glu Asp Pro Val Ala Thr Ala Val Leu  
 65 70 75 80  
 Asn Ala Cys Ala Gly Phe Glu Leu Leu His Ala Ser Gly Leu Ile His  
 85 90 95  
 Asp Asp Ile Ile Asp Ala Ser Gln Thr Arg Arg Gly His Pro Ala Ala  
 100 105 110  
 His Val Ala Tyr Ala Glu Arg His Arg Ala Arg Arg Phe Ser Gly Asp  
 115 120 125  
 Pro Gly Thr Phe Gly Thr Gly Thr Ala Ile Leu Ile Gly Asp Leu Val  
 130 135 140  
 Leu Ile Trp Ala Asp Val Leu Val Arg Ala Ser Gly Leu Pro Ala Asp  
 145 150 155 160  
 Ala His Val Arg Val Ser Pro Val Trp Ser Ala Val Arg Ser Glu Val  
 165 170 175  
 Met Tyr Gly Gln Leu Leu Asp Leu Ile Ser Gln Val Ser Arg Ser Glu  
 180 185 190  
 Asp Val Asp Ala Ala Leu Arg Ile Asn Gln Tyr Lys Thr Ala Ser Tyr  
 195 200 205  
 Thr Val Glu Arg Pro Leu Gln Phe Gly Ala Ala Ile Ala Gly Ala Asp  
 210 215 220  
 Asp Asp Leu Phe Ala Ala Tyr Arg Ala Phe Gly Ala Asp Val Gly Ile  
 225 230 235 240  
 Ala Phe Gln Leu Arg Asp Asp Leu Leu Gly Val Phe Gly Asp Pro Val  
 245 250 255  
 Val Thr Gly Lys Pro Ser Gly Asp Asp Leu Arg Glu Gly Lys Arg Thr  
 260 265 270  
 Val Leu Leu Ala Thr Ala Leu Lys Arg Ala Asp Glu Arg Asp Pro Asp  
 275 280 285  
 Ala Ala Ala Tyr Leu Arg Ala Lys Val Gly Thr Asp Leu Ala Asp Glu  
 290 295 300  
 Glu Ile Ala Arg Ile Arg Ala Ile Phe Arg Asp Val Gly Ala Val Glu  
 305 310 315 320  
 Glu Ile Glu Arg Gln Ile Ser Gln Arg Thr Asp Arg Ala Leu Ala Ala  
 325 330 335  
 Leu Glu Ala Ser Ser Ala Thr Ala Pro Ala Lys His Gln Leu Ala Asp  
 340 345 350

Met Ala Ile Lys Ala Thr Gln Arg Ala Gln  
 355 360

<210> 9  
 <211> 1089  
 <212> DNA  
 <213> Micromonospora sp. strain 046-EC011

<400> 9  
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 gtcgccgagc tggagagcta cgtcctgcgg ggccggaagc gcatccggcc cgccttcgcc 180  
 tggctgggct ggatcgggcgc cggcggcgac ccggaggacc cggtggcgac cgcggtgctg 240  
 aacgcctgcg ccgggttcga gctgctgcac gcgtccggcc tcatccacga cgacatcatc 300  
 gacgcgtcgc agaccgcgcg cggccatccc gccgcgcacg tcgcgtacgc cgaacggcat 360  
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 aaccagtaca agaccgcgtc gtacacggtg gagcggccac tgcagttcgg cgcggcgatc 660  
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 ctgcgggacg aggagatcgc ccgcattcgc gccattcttc gcgacgtcgg cgcggtcgag 960  
 gagatcgagc ggcagatctc gcagcgcacc gaccgggcgc tggccgcgct ggaggcgagc 1020  
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 gccagtgatg 1089

<210> 10  
 <211> 354  
 <212> PRT  
 <213> Micromonospora sp. strain 046-EC011

<400> 10

Met Ser Thr Glu Pro Val Thr Val Val Ala Arg Gly Val Leu Asp Gly

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Arg Gly Asp Gly Pro Gly Arg Leu Gly Thr Gly Arg Ala His Gly Lys	20	25	30
Ala Ile Leu Leu Gly Glu His Ala Val Val Tyr Gly Ala Pro Ala Leu	35	40	45
Ala Val Pro Val Pro Gln Leu Thr Ala Val Ala Lys Ala Arg Arg Ala	50	55	60
Gly Gly Asp Gly Gly Asp Glu Val Ser Phe Ala Ile Ala Gly Leu Glu	65	70	75
Ser Pro Glu Val Thr Ser Leu Pro Thr Asp Gly Leu Gln His Leu Val	85	90	95
Thr Glu Phe Arg Gln Arg Ala Ala Val Thr Glu Pro Met Arg Val Asp	100	105	110
Val Leu Val Asp Cys Ala Ile Pro Gln Gly Arg Gly Leu Gly Ser Ser	115	120	125
Ala Ala Cys Ala Arg Ala Ala Val Leu Ala Leu Ala Asp Ala Phe Asp	130	135	140
Arg Arg Leu Asp Ala Ala Thr Val Phe Asp Leu Val Gln Thr Ser Glu	145	150	155
Asn Val Ala His Gly Arg Ala Ser Gly Ile Asp Ala Leu Ala Thr Gly	165	170	175
Ala Thr Ala Pro Leu Ile Phe Arg Asn Gly Val Gly Arg Glu Leu Pro	180	185	190
Val Ala Met Ala Gly Ala Ala Arg Ala Ala Arg Gly Ser Gly Pro Ala	195	200	205
Gly Phe Asp Ala Val Leu Val Ile Ala Asp Ser Gly Val Ser Gly Ser	210	215	220
Thr Arg Asp Ala Val Glu Leu Leu Arg Gly Ala Phe Glu Arg Ser Pro	225	230	235
Arg Thr Arg Asp Glu Phe Val Ser Arg Val Thr Ser Leu Thr Glu Ala	245	250	255
Ala Ala His Asp Leu Leu Gln Gly Arg Val Ala Asp Phe Gly Ala Arg	260	265	270
Leu Thr Glu Asn His Arg Leu Leu Arg Glu Val Gly Ile Ser Thr Glu	275	280	285
Arg Ile Asp Arg Met Val Asp Ala Ala Leu Ala Ala Gly Ser Pro Gly	290	295	300
Ala Lys Ile Ser Gly Gly Gly Leu Gly Gly Cys Met Ile Ala Leu Ala			

305	310	315	320
Arg Asp Arg Gln Glu Ser Ala Ala Val Val Arg Ser Val Gln Gln Ala			
	325	330	335
Gly Ala Val Arg Thr Trp Thr Val Pro Met Gly Arg Phe Thr Gly His			
	340	345	350
Asp Asp			

<210> 11  
 <211> 1065  
 <212> DNA  
 <213> Micromonospora sp. strain 046-EC011

<400> 11  
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 gtcgtgtacg gcgctccggc gctcgccgtc ccggtgccgc aactgaccgc cgtggccaag 180  
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 cagcggggccg ccgtcaccga gccgatgcgc gtcgacgtgc tcgtggactg cgccatcccg 360  
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 gacgcgttcg accgccgcct cgacgccgcc acggtgttcg atctggtgca gacctcggag 480  
 aacgtggcgc acggccgggc cagcggcatc gacgccctgg ccaccggtgc gaccgcgccg 540  
 ctgatcttcc gcaacggcgt gggccgggaa ctgccggtcg ccatggcggg cgccgcgcgt 600  
 gccgcgcgag ggtcggggcc ggccggcttc gacgcgggtc tcgtcatcgc cgacagcggc 660  
 gtcagcggca gcacccggga cgcggtggag ctgctgcggg gtgccttcga gcgtccccg 720  
 cgcacgcgcg acgagttcgt cagccgggtg accagcctga ccgaggcggc ggcgcacgac 780  
 ctgctccagg gccgggtcgc cgacttcggc gcgcggctga ccgagaacca ccggctgttg 840  
 cgcgaggtcg gcatcagcac cgaacggatc gaccggatgg tcgacgccgc gctcgcggcg 900  
 ggcagcccgg gcgccaagat cagcggcggt ggcctgggcg gctgcatgat cgcactggcc 960  
 cgggaccgcc aggaatccgc ggcggtggtg cggagcgtcc agcaggccgg cgccgtccgc 1020  
 acctggaccg tcccgatggg gaggttcacc ggccatgacg actga 1065

<210> 12  
 <211> 346  
 <212> PRT



<213> Micromonospora sp. strain 046-EC011

<400> 12

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Pro Ala Thr Ala Val Ala His Pro Asn Ile Ala Leu Ile Lys Tyr Trp  
20 25 30  
Gly Lys Arg Asp Glu Gln Leu Met Ile Pro Tyr Ala Asp Ser Leu Ser  
35 40 45  
Met Thr Leu Asp Val Phe Pro Thr Thr Thr Thr Val Arg Ile Asp Ser  
50 55 60  
Gly Ala Ala Ala Asp Glu Val Val Leu Asp Gly Ser Pro Ala Asp Gly  
65 70 75 80  
Glu Arg Arg Gln Arg Val Val Thr Phe Leu Asp Leu Val Arg Lys Leu  
85 90 95  
Ala Gly Arg Thr Glu Arg Ala Cys Val Asp Thr Arg Asn Ser Val Pro  
100 105 110  
Thr Gly Ala Gly Leu Ala Ser Ser Ala Ser Gly Phe Ala Ala Leu Ala  
115 120 125  
Leu Ala Gly Ala Ala Ala Tyr Gly Leu Asp Leu Asp Thr Thr Ala Leu  
130 135 140  
Ser Arg Leu Ala Arg Arg Gly Ser Val Ser Ala Ser Arg Ser Val Phe  
145 150 155 160  
Gly Gly Phe Ala Met Cys His Ala Gly Pro Gly Ala Gly Thr Ala Ala  
165 170 175  
Asp Leu Gly Ser Tyr Ala Glu Pro Val Pro Val Ala Pro Leu Asp Val  
180 185 190  
Ala Leu Val Ile Ala Ile Val Asp Ala Gly Pro Lys Ala Val Ser Ser  
195 200 205  
Arg Glu Gly Met Arg Arg Thr Val Arg Thr Ser Pro Leu Tyr Gln Ser  
210 215 220  
Trp Val Ala Ser Gly Arg Ala Asp Leu Ala Glu Met Arg Ala Ala Leu  
225 230 235 240  
Leu Gln Gly Asp Leu Asp Ala Val Gly Glu Ile Ala Glu Arg Asn Ala  
245 250 255  
Leu Gly Met His Ala Thr Met Leu Ala Ala Arg Pro Ala Val Arg Tyr  
260 265 270  
Leu Ala Pro Val Thr Val Ala Val Leu Asp Ser Val Leu Arg Leu Arg  
275 280 285

Ala Asp Gly Val Ser Ala Tyr Ala Thr Met Asp Ala Gly Pro Asn Val  
 290 295 300

Lys Val Leu Cys Arg Arg Ala Asp Ala Asp Arg Val Ala Asp Thr Leu  
 305 310 315 320

Arg Asp Ala Ala Pro Ser Cys Ala Val Val Val Ala Gly Pro Gly Pro  
 325 330 335

Ala Ala Arg Pro Asp Pro Gly Ser Arg Pro  
 340 345

<210> 13

<211> 1041

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 13

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atcccgtagc ccgacagcct gtcgatgacg ctcgacgtct tcccgaccac caccaccgtc      180
cggatcgaca gcggcgcggc ggccgacgag gtcgtcctcg acggctcgcc cgccgacggc      240
gaacggcgac agcgcgtcgt caccttctcg gacctggtac gcaagctggc cgggcgcacg      300
gaacggggct gcgtcgacac ccgcaactcc gtgccaccg gcgccggcct ggcgtcctcg      360
gcgagcggat tcgccgcct cgcctcgcgc ggcgcgcgcg cgtacggcct cgacctggac      420
accaccgcgc tgtccgcct ggcccggcgg ggatccgtgt cggcctcccg gtcggtcttc      480
ggcggcttcg cgatgtgcca cgcaggcccc ggccgcggga ccgccgcgga cctcggctcc      540
tacgccgagc cggtgcccgt cgcgccctc gacgtcgcgc tggatgatgc gatcgtcgac      600
gccggggcca aggcggtgtc gagccgcgag gggatgcggc gaaccgtccg gacctccccg      660
ctctatcagt cgtgggtcgc ctccggccgc gccgacctgg ccgagatgcg ggccgcgctg      720
ctccagggag acctggacgc ggtcggcgag atcgccgaac gcaacgccct cggcatgcac      780
gccaccatgc tggccgcccg gccggcgggt cgctacctgg cgccggtcac tgtcgccgtg      840
ctcgacagcg tgctgcgcct gcgcgccgac ggcgtctccg cctacgccac gatggacgcg      900
ggaccgaacg tcaaggtgct ctgccgccgc gcggacgcg accgggtcgc cgacaccctg      960
cgcgacgccg cgccgagctg cgccgtggtc gtcgccggac cggggccggc ggcccgcccg     1020
gaccggggca gccggccgtg a                                           1041

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<210> 14

<211> 369  
 <212> PRT  
 <213> Micromonospora sp. strain 046-EC011

<400> 14

Val	Thr	Gly	Pro	Gly	Ala	Val	Arg	Arg	His	Ala	Pro	Gly	Lys	Leu	Phe
1				5					10					15	
Val	Ala	Gly	Glu	Tyr	Ala	Val	Leu	Glu	Pro	Gly	His	Pro	Ala	Leu	Leu
			20					25					30		
Val	Ala	Val	Asp	Arg	Gly	Val	Asp	Val	Thr	Val	Ser	Gly	Ala	Asp	Ala
			35					40				45			
His	Leu	Val	Val	Asp	Ser	Asp	Leu	Cys	Pro	Glu	Gln	Ala	Cys	Leu	Arg
	50					55					60				
Trp	Gln	Asp	Gly	Arg	Leu	Val	Gly	Ala	Gly	Asp	Gly	Gln	Pro	Ala	Pro
65					70					75					80
Asp	Ala	Leu	Gly	Ala	Val	Val	Ser	Ala	Ile	Glu	Val	Val	Gly	Glu	Leu
				85					90					95	
Leu	Thr	Gly	Arg	Gly	Leu	Arg	Pro	Leu	Pro	Met	Arg	Val	Ala	Ile	Thr
			100					105						110	
Ser	Arg	Leu	His	Arg	Asp	Gly	Thr	Lys	Phe	Gly	Leu	Gly	Ser	Ser	Gly
		115					120					125			
Ala	Val	Thr	Val	Ala	Thr	Val	Thr	Ala	Val	Ala	Ala	Tyr	His	Gly	Val
		130					135					140			
Glu	Leu	Ser	Leu	Glu	Ser	Arg	Phe	Arg	Leu	Ala	Met	Leu	Ala	Thr	Val
145					150					155					160
Arg	Asp	Gly	Ala	Asp	Ala	Ser	Gly	Gly	Asp	Leu	Ala	Ala	Ser	Val	Trp
				165					170					175	
Gly	Gly	Trp	Ile	Ala	Tyr	Gln	Ala	Pro	Asp	Arg	Ala	Ala	Val	Arg	Glu
			180					185						190	
Met	Ala	Arg	Arg	Arg	Gly	Val	Glu	Glu	Thr	Met	Arg	Ala	Pro	Trp	Pro
		195					200						205		
Gly	Leu	Arg	Val	Arg	Arg	Leu	Pro	Pro	Pro	Arg	Gly	Leu	Ala	Leu	Glu
	210					215					220				
Val	Gly	Trp	Thr	Gly	Glu	Pro	Ala	Ser	Ser	Ser	Ser	Leu	Thr	Gly	Arg
225					230					235					240
Leu	Ala	Ala	Ser	Arg	Trp	Arg	Gly	Ser	Pro	Ala	Arg	Trp	Ser	Phe	Thr
				245					250					255	
Ser	Arg	Ser	Gln	Glu	Cys	Val	Arg	Thr	Ala	Ile	Asp	Ala	Leu	Glu	Arg
			260					265					270		

Gly Asp Asp Gln Glu Leu Leu His Gln Val Arg Arg Ala Arg His Val  
 275 280 285  
 Leu Ala Glu Leu Asp Asp Glu Val Arg Leu Gly Ile Phe Thr Pro Arg  
 290 295 300  
 Leu Thr Ala Leu Cys Asp Ala Ala Glu Thr Val Gly Gly Ala Ala Lys  
 305 310 315 320  
 Pro Ser Gly Ala Gly Gly Gly Asp Cys Gly Ile Ala Leu Leu Asp Ala  
 325 330 335  
 Thr Ala Ala Thr Arg Thr Ala Arg Leu Arg Glu Gln Trp Ala Ala Ala  
 340 345 350  
 Gly Val Leu Pro Met Pro Ile Gln Val His Gln Thr Asn Gly Ser Ala  
 355 360 365

Arg

<210> 15  
 <211> 1110  
 <212> DNA  
 <213> Micromonospora sp. strain 046-EC011

<400> 15  
 gtgaccggcc cgggcgccgt gcgccgccac gcgccgggca agctgttcgt cgccggtgag 60  
 tacgcggtgc tggagccggg ccacccggcg ctgctggtgg cggtcgacag gggagtggac 120  
 gtcaccgtct cgggcgccga cgcccacctc gttgtcgact ccgacctctg ccgggagcag 180  
 gcgtgcctgc ggtggcagga cggccggctc gtcggcgcgg gcgacgggca gccggcgccc 240  
 gacgcctcgc gcgccgtggt ctcggcgatc gaggtggtcg gcgaactcct gaccggacga 300  
 gggctgcgcc cgctgcccat gcgggtggcg atcaccagcc ggctgcaccg cgacggcacg 360  
 aagttcggcc tcgggtcgag cggggcggtg acagtcgcca cggtgaccgc agtggccgcg 420  
 taccacgggg tggagctgtc gtcgcaatcg cggttccggc tggcgatgct ggcgacggtg 480  
 cgtgacggcg ccgacgcctc cggcgggtgat ctggccgcga gcgtctgggg cggttgatc 540  
 gcctaccagg cggccgaccg cgcggccgtg cgcgagatgg cgcggcggcg cggcgctcag 600  
 gagacgatgc gcgcgcctg gccgggcctg cgggtccggc ggctgccacc accgcgtggc 660  
 ctcgcgctgg aggtgggctg gaccggcgag ccggcgagca gcagctcgtt gaccgggcg 720  
 ctggccgcct cccggtggcg gggcagcccg gcgcggtgga gcttcaccag ccgtagccag 780  
 gagtgtgtgc gtaccgccat cgacgcgctg gagcggggcg acgaccagga actgctgcac 840  
 caggtccggc gggcccgga cgtgcttgcc gagctggacg acgaggtccg gctcgggatc 900

ttcaccccc ggctgacggc gctgtgacgac gccgcccagaga ccgtcggcgg cgccggccaaa 960  
ccgtccggcg ccggtggcgg ggactgcggc atcgcgttgc tggacgccac cgccgcgacg 1020  
cggaccgcgc ggctgcgcga gcagtggggc gccgcccggg tgctcccat gccgatccag 1080  
gtccatcaga cgaacgggag cgcgcatga 1110

<210> 16  
<211> 360  
<212> PRT  
<213> Micromonospora sp. strain 046-EC011

<400> 16

Met Ile Ala Asn Arg Lys Asp Asp His Val Arg Leu Ala Ala Glu Gln  
1 5 10 15

Gln Gly Arg Leu Gly Gly His His Glu Phe Asp Asp Val Ser Phe Val  
20 25 30

His His Ala Leu Ala Gly Ile Asp Arg Ser Asp Val Ser Leu Ala Thr  
35 40 45

Ser Phe Gly Gly Ile Asp Trp Pro Val Pro Leu Cys Ile Asn Ala Met  
50 55 60

Thr Gly Gly Ser Thr Lys Thr Gly Leu Ile Asn Arg Asp Leu Ala Ile  
65 70 75 80

Ala Ala Arg Glu Thr Gly Val Pro Ile Ala Thr Gly Ser Met Ser Ala  
85 90 95

Tyr Phe Ala Asp Glu Ser Val Ala Glu Ser Phe Ser Val Met Arg Arg  
100 105 110

Glu Asn Pro Asp Gly Phe Ile Met Ala Asn Val Asn Ala Thr Ala Ser  
115 120 125

Val Glu Arg Ala Arg Arg Ala Val Asp Leu Met Arg Ala Asp Ala Leu  
130 135 140

Gln Ile His Leu Asn Thr Ile Gln Glu Thr Val Met Pro Glu Gly Asp  
145 150 155 160

Arg Ser Phe Ala Ala Trp Gly Pro Arg Ile Glu Gln Ile Val Ala Gly  
165 170 175

Val Gly Val Pro Val Ile Val Lys Glu Val Gly Phe Gly Leu Ser Arg  
180 185 190

Glu Thr Leu Leu Arg Leu Arg Asp Met Gly Val Arg Val Ala Asp Val  
195 200 205

Ala Gly Arg Gly Gly Thr Asn Phe Ala Arg Ile Glu Asn Asp Arg Arg  
210 215 220

Asp Ala Ala Asp Tyr Ser Phe Leu Asp Gly Trp Gly Gln Ser Thr Pro  
 225 230 235 240  
 Ala Cys Leu Leu Asp Ala Gln Gly Val Asp Leu Pro Val Leu Ala Ser  
 245 250 255  
 Gly Gly Ile Arg Asn Pro Leu Asp Val Val Arg Gly Leu Ala Leu Gly  
 260 265 270  
 Ala Gly Ala Ala Gly Val Ser Gly Leu Phe Leu Arg Thr Leu Leu Asp  
 275 280 285  
 Gly Gly Val Pro Ala Leu Leu Ser Leu Leu Ser Thr Trp Leu Asp Gln  
 290 295 300  
 Ile Glu Ala Leu Met Thr Ala Leu Gly Ala Arg Thr Pro Ala Asp Leu  
 305 310 315 320  
 Thr Arg Cys Asp Leu Leu Ile Gln Gly Arg Leu Ser Ala Phe Cys Ala  
 325 330 335  
 Ala Arg Gly Ile Asp Thr His Arg Leu Ala Thr Arg Ser Gly Ala Thr  
 340 345 350  
 His Glu Met Ile Gly Gly Ile Arg  
 355 360

<210> 17  
 <211> 1083  
 <212> DNA  
 <213> Micromonospora sp. strain 046-EC011

<400> 17  
 atgatcgcca accgcaagga cgaccacgtc cggctcgccg ccgagcagca gggccggctc 60  
 ggcggtcacc acgagttcga cgacgtgtcc ttcgtgcacc acgccctggc cggcacgcac 120  
 cggtcgcacg tctcgttggc cagctcgttc ggccggcatcg actggccggt gccgctgtgc 180  
 atcaacgcga tgaccggcgg cagcaccaag accggcctga tcaaccggga cctggcgatc 240  
 gcggcccggg agaccggcgt accgatcgcc accgggtcga tgagcgccta cttcgccgac 300  
 gagtcggtgg ccgagagttt cagcgtgatg cgccgggaga accccgacgg gttcatcatg 360  
 gccaacgtca acgccaccgc ctccgtcgaa cgggcccggc gggctgtcga cctgatgcgg 420  
 gccgacgcgc tgcagatcca cctgaacacc atccaggaga cggatgatgcc ggagggggac 480  
 cggtcgttcg ccgcctgggg gccgcggatc gaacagatcg tcgccggcgt cggtgtgccg 540  
 gtgatcgtca aggaggtcgg cttcgggctc agccgcgaaa cgctgctgcg gctgcgggac 600  
 atgggcgtcc ggggtggcga cgtcgccggc cgccggcgga cgaacttcgc gcgcatcgag 660  
 aacgaccggc gggacgccgc cgactactcc ttctcgacg ggtggggaca gtcgacaccc 720

gcctgcctgc tggacgccca gggcgtggac ctgcccgctgc tggcctccgg cggcatccgc 780  
aaccgcctcg acgtggtccg cgggctggcg ctccggcgccg gcgcggccgg ggtgtccgga 840  
ctgttctctgc gcacgtcctt ggacggcggc gtgccggcgc tgctgtcgt gctgtccacc 900  
tggctcgacc agatcgaagc cctgatgacc gccctgggcg cgcggacccc ggccgacctg 960  
acccgctcgc acctgctgat ccagggtcgg ctgagcgcgt tctgcgcggc ccggggcatc 1020  
gacaccacc gcctcgccac ccgttcgggc gccaccacg agatgatcgg aggcattcga 1080  
tga 1083

<210> 18  
<211> 351  
<212> PRT  
<213> Micromonospora sp. strain 046-EC011

<400> 18

Met	Asn	Asp	Ala	Ile	Ala	Gly	Val	Pro	Met	Lys	Trp	Val	Gly	Pro	Val
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Arg	Ile	Ser	Gly	Asn	Val	Ala	Gln	Ile	Glu	Thr	Glu	Val	Pro	Leu	Ala
			20					25					30		
Thr	Tyr	Glu	Ser	Pro	Leu	Trp	Pro	Ser	Val	Gly	Arg	Gly	Ala	Lys	Ile
		35					40					45			
Ser	Arg	Met	Val	Glu	Ala	Gly	Ile	Val	Ala	Thr	Leu	Val	Asp	Glu	Arg
	50					55					60				
Met	Thr	Arg	Ser	Val	Phe	Val	Arg	Ala	Lys	Asp	Ala	Gln	Thr	Ala	Tyr
65					70					75					80
Leu	Ala	Ser	Leu	Glu	Val	Asp	Ala	Arg	Phe	Asp	Glu	Leu	Arg	Asp	Ile
			85					90						95	
Val	Arg	Thr	Cys	Gly	Arg	Phe	Val	Glu	Leu	Ile	Gly	Phe	His	His	Glu
			100					105					110		
Ile	Thr	Ala	Asn	Leu	Leu	Phe	Leu	Arg	Phe	Ser	Phe	Thr	Thr	Gly	Asp
		115					120					125			
Ala	Ser	Gly	His	Asn	Met	Ala	Thr	Leu	Ala	Ala	Asp	Ala	Leu	Leu	Lys
		130				135					140				
His	Ile	Leu	Asp	Thr	Ile	Pro	Gly	Ile	Ser	Tyr	Gly	Ser	Ile	Ser	Gly
145					150					155					160
Asn	Tyr	Cys	Thr	Asp	Lys	Lys	Ala	Thr	Ala	Ile	Asn	Gly	Ile	Leu	Gly
				165					170					175	
Arg	Gly	Lys	Asn	Val	Val	Thr	Glu	Leu	Val	Val	Pro	Arg	Glu	Ile	Val

180	185	190
His Asp Ser Leu His Thr Thr Ala Ala Ala Ile Ala Gln Leu Asn Val		
195	200	205
His Lys Asn Met Ile Gly Thr Leu Leu Ala Gly Gly Ile Arg Ser Ala		
210	215	220
Asn Ala His Tyr Ala Asn Met Leu Leu Gly Phe Tyr Leu Ala Thr Gly		
225	230	235
Gln Asp Ala Ala Asn Ile Val Glu Gly Ser Gln Gly Val Thr Val Ala		
245	250	255
Glu Asp Arg Asp Gly Asp Leu Tyr Phe Ser Cys Thr Leu Pro Asn Leu		
260	265	270
Ile Val Gly Thr Val Gly Asn Gly Lys Gly Leu Gly Phe Val Glu Glu		
275	280	285
Asn Leu Glu Arg Leu Gly Cys Arg Ala Ser Arg Asp Pro Gly Glu Asn		
290	295	300
Ala Arg Arg Leu Ala Val Ile Ala Ala Ala Thr Val Leu Cys Gly Glu		
305	310	315
Leu Ser Leu Leu Ala Ala Gln Thr Asn Pro Gly Glu Leu Met Arg Ala		
325	330	335
His Val Arg Leu Glu Arg Pro Thr Glu Thr Thr Lys Ile Gly Ala		
340	345	350

<210> 19

<211> 1056

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 19

atgaacgacg c gatcgccg tgtgcccattg aaatgggtag gtcccgtgcg gatctcggga 60

aacgtggcgc agatcgagac ggaggttccg ctcgccacgt acgagtcgcc gctctggccg 120

tccgtcggcc ggggcgcgaa gatctcccgg atggtcgagg cgggcatcgt cgccacgctc 180

gtcgacgagc gcatgacccg ctcggtgttc gtgcgcgcca aggacgcgca gaccgcctac 240

ctggcctcgc ttgaggtcga cgcgcggttc gacgaactgc gtgacatcgt gcgcacctgc 300

ggcaggttcg tcgagctgat cgggttccac cagagatca ccgcgaacct gctgttcctg 360

cggttcagtt tcaccaccgg cgacgcgtcc gggcacaaca tggcgacgct ggccgcccgc 420

gcgctgctga agcacatcct ggacaccatt cggggcatct cgtacggctc gatctcgggc 480

aactactgca ccgacaagaa ggccaccgcg ataaacggca ttctcggccg gggcaagaac 540

gtggtcaccg agctggtcgt gccgcgggag atcgtccacg acagcctgca cacgacggcg 600



gcggcgatcg cccagctgaa cgtgcacaag aacatgatcg gcacgttgct cgccggcggt 660  
atccgctcgg ccaacgcca ctacgcgaac atgctgctcg ggttctacct ggccacgggt 720  
caggacgccg cgaacatcgt cgagggctcc caggggctga cggtcgccga ggaccgcgac 780  
ggcgacctct acttctcctg cacgctgccc aacctgatcg tgggcaccgt cggcaacggc 840  
aaggggctcg gcttcgtcga ggagaacctg gagcggctcg gctgccgcgc ctgcgctgat 900  
ccgggcgaga acgcccggcg gctcgcggtc atcgcggccg cgacgggtgct ctgcggcgag 960  
ctgtccctgc tcgccgcga gaccaaccg ggcgagctga tgcgggcgca cgtccggctc 1020  
gaacgcccga ccgagaccac gaagatcgga gcctga 1056

<210> 20  
<211> 391  
<212> PRT  
<213> Micromonospora sp. strain 046-EC011

<400> 20

Met Ala Glu Arg Pro Ala Val Gly Ile His Asp Leu Ser Ala Ala Thr  
1 5 10 15

Ala His His Val Leu Thr His Glu Thr Leu Ala Ala Ser Asn Gly Ala  
20 25 30

Asp Val Ala Lys Tyr His Arg Gly Ile Gly Leu Arg Ala Met Ser Val  
35 40 45

Pro Ala Pro Asp Glu Asp Ile Val Thr Met Ala Ala Ala Ala Ala Ala  
50 55 60

Pro Val Val Ala Arg His Gly Thr Asp Arg Ile Arg Thr Val Val Phe  
65 70 75 80

Ala Thr Glu Ser Ser Val Asp Gln Ala Lys Ala Ala Gly Ile His Val  
85 90 95

His Ser Leu Leu Gly Leu Pro Ser Ala Thr Arg Val Val Glu Leu Lys  
100 105 110

Gln Ala Cys Tyr Gly Gly Thr Ala Gly Leu Gln Phe Ala Ile Gly Leu  
115 120 125

Val His Arg Asp Pro Ser Gln Gln Val Leu Val Ile Ala Ser Asp Val  
130 135 140

Ser Lys Tyr Ala Leu Gly Glu Pro Gly Glu Ala Thr Gln Gly Ala Ala  
145 150 155 160

Ala Val Ala Met Leu Val Gly Ala Asp Pro Ala Leu Val Arg Val Glu  
165 170 175

Asp Pro Ser Gly Met Phe Thr Ala Asp Val Met Asp Phe Trp Arg Pro  
 180 185 190  
 Asn Tyr Arg Thr Thr Ala Leu Val Asp Gly His Glu Ser Ile Ser Ala  
 195 200 205  
 Tyr Leu Gln Ala Leu Glu Gly Ser Trp Lys Asp Tyr Thr Glu Arg Gly  
 210 215 220  
 Gly Arg Thr Leu Asp Glu Phe Gly Ala Phe Cys Tyr His Gln Pro Phe  
 225 230 235 240  
 Pro Arg Met Ala Asp Lys Ala His Arg His Leu Leu Asn Tyr Cys Gly  
 245 250 255  
 Arg Asp Val Asp Asp Ala Leu Val Ala Gly Ala Ile Gly His Thr Thr  
 260 265 270  
 Ala Tyr Asn Ala Glu Ile Gly Asn Ser Tyr Thr Ala Ser Met Tyr Leu  
 275 280 285  
 Gly Leu Ala Ala Leu Leu Asp Thr Ala Asp Asp Leu Thr Gly Arg Thr  
 290 295 300  
 Val Gly Phe Leu Ser Tyr Gly Ser Gly Ser Val Ala Glu Phe Phe Ala  
 305 310 315 320  
 Gly Thr Val Val Pro Gly Tyr Arg Ala His Thr Arg Pro Asp Gln His  
 325 330 335  
 Arg Ala Ala Ile Asp Arg Arg Gln Glu Ile Asp Tyr Ala Thr Tyr Arg  
 340 345 350  
 Glu Leu His Glu His Ala Phe Pro Val Asp Gly Gly Asp Tyr Pro Ala  
 355 360 365  
 Pro Glu Val Thr Thr Gly Pro Tyr Arg Leu Ala Gly Leu Ser Gly His  
 370 375 380  
 Lys Arg Val Tyr Glu Pro Arg  
 385 390

<210> 21

<211> 1176

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 21

atggccgaga gacccgccgt cggcatccac gacctgtccg ccgcgacggc gcatcacgtg	60
ctgacacacg agaccctggc cgcgagcaac ggcgccgacg tggccaagta ccaccgtggc	120
atcgggctgc gggcgatgag cgtgccccgcc ccggacgagg acatcgtgac gatggctgct	180
gccgccgccg cgccggtggt cgccccccac ggcaccgacc ggatccggac cgtcgtgttc	240

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gccacggagt cgtcggtcga ccaggcgaag gcggccggga tacacgtcca ctccctgctc 300
ggcctccctt cggccacccg ggtggtcgag ctgaagcagg cctgctacgg cggtagcgcg 360
ggactgcagt tcgccatcgg cctgggtgcac cgtgaccggt cgcagcaggt cctgggtgatc 420
gccagcgacg tgtcgaagta cgcgctgggt gagccccggc aggcgaccca gggcgccgcg 480
gcggtcgcca tgctcgtcgg cgcggacccg gcgctgggtac gcgtcgagga cccgctcgggc 540
atgttcaccg ccgacgtcat ggacttctgg cggccgaact accgcaccac cgccctggtc 600
gacgggcacg agtccatctc cgcctacctg caggcgctgg agggctcgtg gaaggactac 660
accgagcgcg gcggtcgcac cctggacgag ttcggcgcggt tctgctacca ccagccgttc 720
ccgaggatgg ccgacaaggc gcaccggcac ctgctcaact actgcgggcg cgacgtcgac 780
gacgcgctgg tggccggggc catcgggcac accaccgctg acaacgccga gatcggcaac 840
agctacacgg cgtcgatgta tctcgggctc gcggcactgc tcgacaccgc cgacgacctg 900
accggccgga ccgtcggctt cctcagctac gggctcggca gcgtcgccga gttcttcgcc 960
ggcactgtcg tgcccgggta ccgcgcgcac acgcgacccg accagcaccg cgcggcgatc 1020
gaccggcggc aggagatcga ctacgcgacg taccgggagt tgcacgagca cgccttcccg 1080
gtcgacggcg gcgactatcc ggcgccggag gtgaccaccg ggccgtaccg gctggccggg 1140
ctctccggtc acaagcgctg ctacgagccg cgatag 1176

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<210> 22
<211> 290
<212> PRT
<213> Micromonospora sp. strain 046-EC011

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<400> 22

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Val Ala Glu Leu Tyr Ser Thr Ile Glu Glu Ser Ala Arg Gln Leu Asp
1           5           10           15

```

```

Val Pro Cys Ser Arg Asp Arg Val Trp Pro Ile Leu Ser Ala Tyr Gly
20           25           30

```

```

Asp Ala Phe Ala His Pro Glu Ala Val Val Ala Phe Arg Val Ala Thr
35           40           45

```

```

Ala Leu Arg His Ala Gly Glu Leu Asp Cys Arg Phe Arg Thr His Pro
50           55           60

```

```

Asp Asp Arg Asp Pro Tyr Ala Ser Ala Leu Ala Arg Gly Leu Thr Pro
65           70           75           80

```

```

Arg Thr Asp His Pro Val Gly Ala Leu Leu Ser Glu Val His Arg Arg
85           90           95

```

Cys Pro Val Glu Ser His Gly Ile Asp Phe Gly Val Val Gly Gly Phe  
 100 105 110  
 Lys Lys Ile Tyr Ala Ala Phe Ala Pro Asp Glu Leu Gln Val Ala Thr  
 115 120 125  
 Ser Leu Ala Gly Ile Pro Ala Met Pro Arg Ser Leu Ala Ala Asn Ala  
 130 135 140  
 Asp Phe Phe Thr Arg His Gly Leu Asp Asp Arg Val Gly Val Leu Gly  
 145 150 155 160  
 Phe Asp Tyr Pro Ala Arg Thr Val Asn Val Tyr Phe Asn Asp Val Pro  
 165 170 175  
 Arg Glu Cys Phe Glu Pro Glu Thr Ile Arg Ser Thr Leu Arg Arg Thr  
 180 185 190  
 Gly Met Ala Glu Pro Ser Glu Gln Met Leu Arg Leu Gly Thr Gly Ala  
 195 200 205  
 Phe Gly Leu Tyr Val Thr Leu Gly Trp Asp Ser Pro Glu Ile Glu Arg  
 210 215 220  
 Ile Cys Tyr Ala Ala Ala Thr Thr Asp Leu Thr Thr Leu Pro Val Pro  
 225 230 235 240  
 Val Glu Pro Glu Ile Glu Lys Phe Val Lys Ser Val Pro Tyr Gly Gly  
 245 250 255  
 Gly Asp Arg Lys Phe Val Tyr Gly Val Ala Leu Thr Pro Lys Gly Glu  
 260 265 270  
 Tyr Tyr Lys Leu Glu Ser His Tyr Lys Trp Lys Pro Gly Ala Val Asn  
 275 280 285  
 Phe Ile  
 290

<210> 23

<211> 873

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 23

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cgcgaccggg tctggcccat cctgtccgcg tacggcgacg cgttcgccca tcccaggcgc	120
gtggtcgcct tccgggtggc gaccgcgctg cgtcacgcgg gcgagctgga ctgccggttc	180
cggacgcata cggacgaccg ggacccgta cgcctcggcgc tcgcccgggg cctcaccocg	240
cgcacggacc accccgtcgg cgcgctgctc tccgaggtcc accggcgctg cccgggtggag	300
agccacggca tcgacttcgg ggtggtcggc ggcttcaaga agatctacgc ggccttcgcc	360

ccggacgagc tgcaggtggc cacgtcgctc gccggcattc cggcgatgcc ccgcagcctc 420  
 gccgcgaacg ccgacttctt caccgggcac ggctcgacg accgggtcgg cgtgctggga 480  
 ttcgactacc cggcccggac cgtgaacgctc tacttcaacg acgtgccgcg tgagtgcctc 540  
 gagccggaga ccatccggtc gacgtcgcg cggaccggga tggccgagcc gagcgagcag 600  
 atgctccggc tcggcaccgg ggcgttcggg ctctacgtca cgctgggctg ggactccccg 660  
 gagatcgagc ggatctgcta cgccgcgggc accacggacc tgaccacgct tccggtaccc 720  
 gtggaaccgg agatcgagaa gttcgtgaaa agcgttcgct acggcggcgg ggaccggaag 780  
 ttcgtctacg gcgtggcgct gacccccaa ggggagtact acaaactcga gtcgcactac 840  
 aaatggaagc cgggcgcggg gaacttcatt tga 873

<210> 24  
 <211> 370  
 <212> PRT  
 <213> Micromonospora sp. strain 046-EC011

<400> 24

Val	Trp	Ala	Arg	Val	Lys	Asn	Trp	Val	Val	Ala	Leu	Ala	Val	Ala	Ala
1				5				10					15		
Val	Leu	Met	Ile	Ser	Ala	Leu	Ala	Gly	Asp	His	Pro	Ala	Pro	Glu	Gly
			20					25					30		
Leu	Gly	Leu	Leu	Gly	Phe	Ala	Leu	Val	Ala	Ala	Ser	Gly	Leu	Ala	Leu
			35					40					45		
Ala	Ala	Ser	Arg	Arg	Ala	Pro	Ile	Ala	Val	Leu	Val	Ala	Thr	Gly	Leu
			50				55					60			
Cys	Val	Val	Gly	Tyr	Asn	Ala	Ile	Gly	Phe	Gly	Val	Pro	Ala	Ile	Ala
65					70				75					80	
Tyr	Leu	Phe	Ala	Val	Tyr	Ala	Ala	Val	Arg	Ala	Gly	His	Arg	Leu	Val
				85					90					95	
Thr	Leu	Gly	Ala	Ser	Ala	Ala	Leu	Leu	Val	Val	Leu	Pro	Leu	Ala	Ile
			100					105					110		
Met	Val	Ser	Pro	Ala	Asp	Gly	Ala	Leu	Lys	Glu	Ala	Leu	Ala	Gln	Ser
			115				120					125			
Arg	Gly	Val	Leu	Glu	Leu	Ala	Trp	Leu	Ile	Ala	Ala	Ala	Ala	Ala	Gly
			130				135					140			
Glu	Ala	Leu	Arg	Gln	Ala	Glu	Arg	Arg	Ala	Asp	Glu	Ala	Glu	Arg	Thr
145				150						155				160	

Arg Glu Glu Thr Ala Arg Leu Arg Ala Thr Gln Glu Arg Leu His Ile  
 165 170 175  
 Ala Arg Glu Leu His Asp Ser Leu Thr His Gln Ile Ser Ile Ile Lys  
 180 185 190  
 Val Gln Ala Glu Val Ala Val His Leu Ala Arg Lys Arg Gly Glu Gln  
 195 200 205  
 Val Pro Glu Ser Leu Leu Ala Ile Gln Glu Ala Gly Arg Ala Ala Thr  
 210 215 220  
 Arg Glu Leu Arg Ala Thr Leu Glu Thr Leu Arg Asp Leu Thr Lys Ser  
 225 230 235 240  
 Pro Ser His Gly Leu Asp His Leu Pro Glu Leu Leu Ala Gly Ala Glu  
 245 250 255  
 Lys Ile Gly Leu Ala Thr Thr Leu Thr Ile Glu Gly Asp Gln Arg Asp  
 260 265 270  
 Val Pro Glu Ala Val Gly Arg Thr Ala Tyr Arg Ile Val Gln Glu Ser  
 275 280 285  
 Leu Thr Asn Thr Ala Arg His Ala Ser Ala Ala Ala Ala Val Arg  
 290 295 300  
 Ile Asp Tyr Arg Pro Asp Ala Leu Ser Ile Arg Ile Asp Asp Asp Gly  
 305 310 315 320  
 Thr Ala Arg Pro Gly Ala Ala Pro Val Pro Gly Val Gly Leu Leu Gly  
 325 330 335  
 Met His Glu Arg Val Leu Ala Leu Gly Gly Arg Leu Arg Ala Glu Pro  
 340 345 350  
 Arg Thr Gly Gly Gly Phe Thr Val Gln Ala Glu Leu Pro Val Val Arg  
 355 360 365  
 Val Pro  
 370

<210> 25

<211> 1113

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 25

gtgtgggccc ggggtgaagaa ctgggtcgtc gcgttggtg tggcggcggt gctgatgatc	60
agcgcgctgg cgggtgacca tctgcccc gagggcctcg gtctgctcgg cttcgcgctg	120
gtggcggcga gcggcctggc gctggccgcc agtcgtcggg ccccgatcgc cgtgctggtc	180
gccaccgggc tgtgcgtggt gggctacaac gcgatcggct tcggggtgcc cgccatcgcg	240
tacctgttcg cgggtctacgc ggcgggtccgg gccgggcacc ggctcgtcac gctcggggcg	300

agcgccgccc tgctcgctgt cctgccgctg gcgatcatgg tctcgcccgc ggacggcgcc 360  
 ctcaaggagg cgctcgcgca gtcgcggggc gtgctggaac tggcctggct gatcgccgcg 420  
 gcggcgggccg gtgaggcgct gcggcaggcc gaacggcgag cggacgaggc ggaacggacc 480  
 cgcgaggaga ccgcccggct gcgcgccacc caggagcggc tgcacatcgc acgggagctg 540  
 cactactcgc tcaccacca gatctcgatc atcaaggtgc aggcggaggt ggcggtccac 600  
 ctggcccgcga agcggggcga gcaggtgccg gagtcgctgc tggcgatcca ggaggccggc 660  
 cgggcggcga ctcgcgagct gcgcgcgacc ctggagacgc tgcgtgacct gaccaagtcc 720  
 ccgtcgcacg ggctcgacca cctcccggag ctgctggccg gggccgagaa gatcggcctg 780  
 gccaccacgc tgaccatcga gggcgaccag cgggacgtgc cggaggcggg gggccgcacc 840  
 gcgtaccgga tcgtgcagga gtcgctcacc aacaccgccc ggcacgcctc cgccgcggcc 900  
 gccgcggtcc ggatcgacta ccgcccggac gcgctgagca tccggatcga cgacgacggg 960  
 acggcccggc cgggcgcccgc cccggtgccc ggcgtcgggc tgctggggat gcacgagcgc 1020  
 gtctcgcgc tgggcggccg gctgcgggcg gaaccccgca ccggcgaggg cttcacccgc 1080  
 caggccgaac tcccgggtgt gcgcgtccca tga 1113

<210> 26

<211> 220

<212> PRT

<213> Micromonospora sp. strain 046-EC011

<400> 26

Met	Ile	Arg	Ile	Met	Leu	Leu	Asp	Asp	Gln	Pro	Leu	Leu	Arg	Ser	Gly
1				5					10					15	
Phe	Arg	Ala	Leu	Leu	Asp	Ala	Glu	Asp	Asp	Ile	Glu	Val	Val	Ala	Glu
			20					25					30		
Gly	Gly	Asn	Gly	Arg	Glu	Gly	Leu	Ala	Leu	Ala	Arg	Gln	His	Leu	Pro
		35					40					45			
Asp	Leu	Ala	Leu	Ile	Asp	Ile	Gln	Met	Pro	Val	Met	Asp	Gly	Val	Glu
		50				55					60				
Thr	Thr	Arg	Gln	Ile	Val	Ala	Asp	Pro	Ala	Leu	Ala	Gly	Val	Arg	Val
65				70					75					80	
Val	Ile	Leu	Thr	Asn	Tyr	Gly	Leu	Asp	Glu	Tyr	Val	Phe	His	Ala	Leu
			85					90					95		
Arg	Ala	Gly	Ala	Thr	Gly	Phe	Leu	Val	Lys	Asp	Ile	Glu	Pro	Asp	Asp
		100						105					110		

Leu Leu His Ala Val Arg Val Ala Ala Arg Gly Asp Ala Leu Leu Ala  
 115 120 125

Pro Ser Ile Thr Arg Met Leu Ile Asn Arg Tyr Val Ser Glu Pro Leu  
 130 135 140

Cys Ala Asp Val Thr Pro Gly Met Glu Glu Leu Thr Asn Arg Glu Arg  
 145 150 155 160

Glu Ala Val Ala Leu Ala Ala Arg Gly Leu Ser Asn Asp Glu Ile Ala  
 165 170 175

Asp Arg Met Val Ile Ser Pro Leu Thr Ala Lys Thr His Val Asn Arg  
 180 185 190

Ala Met Thr Lys Leu Gln Ala Arg Asp Arg Ala Gln Leu Val Val Phe  
 195 200 205

Ala Tyr Glu Ser Gly Leu Val Ser Pro Gly Asn Arg  
 210 215 220

<210> 27  
 <211> 663  
 <212> DNA  
 <213> Micromonospora sp. strain 046-EC011

<400> 27  
 atgatcagga tcatgtctgct cgacgaccag ccgctgtctgc gcagcggggtt ccgcgcgctc 60  
 ctcgacgccg aggacgacat cgaggtggtg gccgagggcg ggaacggccg ggagggcctg 120  
 gcgctggccc ggcagcacct gcccgatctc gccctgatcg acatccagat gccggtcatg 180  
 gacggcgctcg agacgacccg gcagatcgtc gcggatccgg cgctggcccg ggtacgcgtc 240  
 gtcattctca ccaactacgg cctcgacgag tacgtcttcc acgcgctgcy gccggcgcc 300  
 accggcttcc tgggtcaagga catcgagccg gacgacctgc tgcacgccgt gcgggtcgcc 360  
 gcgcgcggtg acgcgctgct cgcgccgctc atcaccgga tgctgatcaa caggtacgtg 420  
 tcggagccgc tctgcgcgga cgtcacgccc ggcattggagg agctgacca cggggaacgc 480  
 gagggcgctc ccttgccgc cgggggcctg tccaacgacg agatcgccga tcgcatggtg 540  
 atcagcccgc tgaccgcgaa gacccacgtc aaccgcgcca tgaccaagct gcaggcccgc 600  
 gaccgcgccc agctggtggt gttgcctac gagtccggcc tgggtgcacc cggcaatcgc 660  
 tga 663

<210> 28  
 <211> 131  
 <212> PRT  
 <213> Micromonospora sp. strain 046-EC011



<400> 28

Met Phe Ile Arg Arg Leu Leu Thr Ala Ala Ala Ala Gly Val Leu Gly  
1 5 10 15

Gly Leu Ala Leu Val Ala Pro Ala Ala Ala Gln Val Thr Ala Ala Asp  
20 25 30

Gly Asp Gly Gly Ser Gly Arg Ala Gly Ser Val Leu Ala Leu Ala Leu  
35 40 45

Ala Leu Leu Gly Leu Val Leu Gly Gly Trp Ala Leu Arg Ser Ala Gly  
50 55 60

Arg Gly Gly Gly Arg Gly Asn Ala Ile Ala Ala Leu Val Leu Ala Val  
65 70 75 80

Ala Gly Leu Ile Ala Gly Val Val Ala Leu Ala Gly Ser Asp Gly Gly  
85 90 95

Val Gly Ser Gly Asn Gly Arg Gly Gly Ala Ile Val Ala Val Val Leu  
100 105 110

Ala Leu Ile Gly Ile Ala Val Gly Gly Leu Ala Phe Thr Arg Ser Arg  
115 120 125

Arg Ala Ala  
130

<210> 29

<211> 396

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 29

atgttcatcc gtcgtttgct caccgccgcc gcagccggcg tcctcggtgg gctcgcactc 60

gtcgaccgg cgcccgca ggtgacggcc gccgacggtg acggtggttc cgcccgccc 120

ggatccgtgc tggegtcgc gctcggttg ctggcctcg tcctgggcgg gtgggcgttg 180

cgctccgagg ggcgcggcgg cggtcgtggc aacgcgatcg ccgcgctggt gctcgcggtg 240

gccggcctga tcgcggcgt ggtcgccctg gccggtccg acggtggtgt cgccagcggc 300

aacggcgtg gtggcgccat cgtggcgtc gtgctggcgc tgatcgggat cgccgtcggc 360

ggcctggcat tcaccgctc ccggcgccgc gctga 396

<210> 30

<211> 154

<212> PRT

<213> Micromonospora sp. strain 046-EC011

<400> 30

Met Arg Lys Val Phe Ala Gly Leu Ala Ala Phe Leu Leu Leu Val Leu  
 1 5 10 15  
 Val Val Gln Phe Phe Leu Ala Ala Ser Gly Ala Phe Ser Asn Glu Ala  
 20 25 30  
 Asn Glu Glu Ala Phe Arg Pro His Arg Ile Leu Gly Leu Gly Ser Ile  
 35 40 45  
 Leu Val Ala Val Val Leu Thr Val Ala Ala Ala Val Met Arg Met Pro  
 50 55 60  
 Gly Arg Ile Ile Gly Leu Ser Gly Leu Val Ala Gly Leu Gly Ile Leu  
 65 70 75 80  
 Gln Ala Leu Ile Ala Val Ile Ala Lys Ala Phe Gly Asp Ser Ala Gly  
 85 90 95  
 Asp Ser Ala Val Gly Arg Tyr Val Phe Gly Leu His Ala Val Asn Gly  
 100 105 110  
 Leu Val Met Val Ala Val Ala Arg Val Ile Leu Arg Ser Val Arg Ala  
 115 120 125  
 Ala Pro Asp Thr Thr Thr Thr Pro Gly Val Asp Thr Thr Val Thr Gly  
 130 135 140  
 Pro Ala Ala Asp Ser Ala Arg Thr Ala Ser  
 145 150

<210> 31  
 <211> 465  
 <212> DNA  
 <213> Micromonospora sp. strain 046-EC011

<400> 31  
 atgcgcaaag tgttcgccgg actggcagcg ttcttgctgc tcgtgctcgt ggtgcagttc 60  
 ttcttgcccg ccagcggcgc gttcagcaac gaggccaacg aggaggcgtt ccgccctcac 120  
 cggatcctgg gcctggggag catcctcgtc gccgtggtgc tgacgggtggc cgccgcggtg 180  
 atgcggatgc ccggccggat catcggcctg tccggcctgg tcgccgggct gggcatcctg 240  
 caggccctga tcgcggtcat cgccaaggcg ttcggcgact cggccggtga ctcggccgtc 300  
 ggccggtacg tgttcggcct gcacgcggtc aacggactgg tgatggtggc cgtcgcccgc 360  
 gtcacctcgc gcagcgccg ggcggcgccg gacacgacca ccacgcccgg cgtggacacg 420  
 acggtcaccg gtccggcggc cgactcggcg cgaacggcgt catga 465

<210> 32  
 <211> 661  
 <212> PRT

<213> Micromonospora sp. strain 046-EC011

<400> 32

Met Ser Thr Leu Gln Trp Ile Leu Val Asp His Val Val Ala Leu Leu  
1 5 10 15  
Gly Val Ala Thr Trp Phe Ala Thr Gly Val Thr Ala Ala Leu Gly Arg  
20 25 30  
His Arg Ile Ala Leu Ala Leu Leu Gly Ala Ala Val Leu Val Thr Val  
35 40 45  
Ala Arg Leu Gly Thr Val Ala Leu Leu Ala Asp Arg Gly Trp Trp Phe  
50 55 60  
Val Gln Glu Lys Val Leu Leu Gly Leu Pro Met Leu Gly Ala Ala Gly  
65 70 75 80  
Leu Val Ala Val Leu Leu Ala Gly Pro Arg Leu Leu Ala Ala Arg Gln  
85 90 95  
Ser Pro Ala Ala Asp Leu Pro Ala Gly Ala Leu Val Ala Val Leu Thr  
100 105 110  
Ala Gly Phe Ala Ala Leu Ala Gly Leu Val Val Thr Phe Thr Ala Gly  
115 120 125  
Tyr Pro Leu Thr Trp Ser Thr Ala Leu Ile Ala Val Ala Leu Val Cys  
130 135 140  
Ala Ala Ala Leu Leu Thr Ala Arg Val Val Gly Arg Pro Ala Ala Pro  
145 150 155 160  
Ala Ala Glu Ala Gly Ser Pro Glu His Thr Pro Ala Ala Ala Gly Pro  
165 170 175  
Thr Ala Leu Ser Arg Arg Arg Phe Leu Gly Val Ala Gly Gly Val Val  
180 185 190  
Ala Ala Gly Ala Gly Ala Thr Gly Val Gly Leu Leu Phe Arg Asp Pro  
195 200 205  
Glu Ala Met Val Thr Gly Gly Gly Pro Gly His Ala Gly Gly Ala Arg  
210 215 220  
Pro Lys Val Ser Val Ala Asp Leu Arg Gly Pro Gly Ala Pro Ala Ala  
225 230 235 240  
Gly Gly Thr Ala Arg Arg His Val Leu Thr Ala Arg Thr Gly Thr Val  
245 250 255  
Thr Ile Pro Ser Gly Arg Pro Ile Asp Ala Trp Ser Tyr Glu Gly Arg  
260 265 270  
Leu Pro Gly Pro Ala Ile Thr Ala Thr Glu Gly Asp Leu Ile Glu Val  
275 280 285

Thr Leu Arg Asn Ala Asp Ile Glu Asp Gly Val Thr Val His Trp His  
 290 295 300  
 Gly Tyr Asp Val Pro Cys Gly Glu Asp Gly Ala Pro Gly Ala Thr Gln  
 305 310 315 320  
 His Ala Val Gln Pro Gly Gly Glu Phe Val Tyr Arg Phe Gln Ala Asp  
 325 330 335  
 Gln Val Gly Thr Tyr Trp Tyr His Thr His Gln Ala Ser His Pro Ala  
 340 345 350  
 Val Arg Lys Gly Leu Tyr Gly Thr Leu Val Val Thr Pro Arg Glu Asp  
 355 360 365  
 Arg Pro Glu Ala Glu Arg Gly Leu Asp Leu Thr Leu Pro Val His Thr  
 370 375 380  
 Phe Asp Asp Val Thr Ile Leu Gly Asp Gln Glu Gly Arg Ala Val His  
 385 390 395 400  
 Asp Val Arg Pro Gly Gln Pro Val Arg Leu Arg Leu Ile Asn Thr Asp  
 405 410 415  
 Ser Asn Pro His Trp Phe Ala Val Val Gly Ser Pro Phe Arg Val Val  
 420 425 430  
 Ala Val Asp Gly Arg Asp Leu Asn Gln Pro Gly Glu Val Arg Glu Val  
 435 440 445  
 Gly Leu Arg Leu Pro Ala Gly Gly Arg Tyr Asp Leu Thr Leu Ala Met  
 450 455 460  
 Pro Asp Ala Lys Val Thr Leu Leu Leu Asp Asn Asp Ser Asp Gln Gly  
 465 470 475 480  
 Val Leu Leu Arg Pro Pro Gly Val Gly Gly Gly Asp Arg Pro Leu Pro  
 485 490 495  
 Asp Thr Ala Asp Trp Pro Glu Phe Asp Leu Leu Gly Tyr Gly Glu Pro  
 500 505 510  
 Ala Pro Val Pro Phe Asp Ala Asp Asp Ala Asp Arg His Phe Thr Ile  
 515 520 525  
 Val Leu Asp Arg Ala Leu Ala Met Val Asp Gly Lys Pro Ala Tyr Ala  
 530 535 540  
 Gln Thr Val Asp Gly Arg Ala His Pro Ser Val Pro Asp Gln Leu Val  
 545 550 555 560  
 Arg Glu Gly Asp Val Val Arg Phe Thr Val Val Asn Arg Ser Leu Glu  
 565 570 575  
 Thr His Pro Trp His Leu His Gly His Pro Val Leu Ile Leu Ser Arg  
 580 585 590

Asp Gly Arg Pro Tyr Ser Gly Ser Pro Leu Trp Met Asp Thr Phe Asp  
 595 600 605  
 Val Arg Pro Gly Glu Val Trp Glu Val Ala Phe Arg Ala Asp Asn Pro  
 610 615 620  
 Gly Val Trp Met Asn His Cys His Asn Leu Pro His Gln Glu Gln Gly  
 625 630 635 640  
 Met Met Leu Arg Leu Val Tyr Asp Gly Val Thr Thr Pro Phe Ala Ser  
 645 650 655  
 Thr Ser His Ala His  
 660

<210> 33  
 <211> 1986  
 <212> DNA  
 <213> Micromonospora sp. strain 046-EC011

<400> 33  
 atgagcacgc tccaatggat cctcgtggac cacgtcgtgg cgctgctcgg tgtcgcgacg 60  
 tggttcgcaa cgggtgtcac ggcagctctc ggccgccacc ggatcgcggtt ggcgctcctc 120  
 ggcgcgcggg tgctggtgac agtcgcccg ctagggcacgg tggcgctgct ggccgaccgc 180  
 ggctggtggt tcgtccagga gaagggtctg ctggggctgc cgatgctcgg cgccgcgggg 240  
 ctgctcgagg tgctcctggc cggcccgccg ctgctcgagg cccggcagtc accggcgggc 300  
 gacctgccgg cgggcgcgct ggtcgcgggtg ctgaccgccg gcttcgccgc gctggccggc 360  
 ctggtggtga cgttcaccgc cgggtacccg ctgacgtgga gcaccgcgct gatcgccgtc 420  
 gccctcgtct gcgcgcgccg gctgctcacc gcgcgggttg tcggacgacc cgccgccccg 480  
 gccgcggagg cgggtcctcc ggagcacacg ccggcgggcg cggggccac ggcgctgtcc 540  
 cgccgcgggt tctcggcgt ggccggggga gtggtcgagg cgggcgcgg cgccaccggc 600  
 gtcggcctgc tcttcgcga cccggaggcg atggtcaccg gaggcggccc cggacacgcc 660  
 ggtggcgccc gcccgaaggt ctccgtggcg gacctgcgcg gcccggcg cccggcgggc 720  
 ggcggcacgg cgcgacgcca cgtgctcacc gcccggacgg gcaccgtcac gattccgtcc 780  
 ggacgtccga tcgacgcctg gagctacgag ggccgcctgc ccgggcccgg catcaccgcg 840  
 accgagggcg acctgatcga ggtgacgctc cgcaacgccg acatcgagga cggcgctcacc 900  
 gtgcactggc acgggtacga cgtgccgtgc ggcgaggacg gcgcgcccgg cgccacgcag 960  
 cacgcggtgc agcccgggcg cgagttcgtc taccggttcc aggcggacca ggtggggacg 1020  
 tactggtacc acaccacca ggcgtgcac cccgccgtgc gcaaagggt gtacgggacg 1080

ctcgtcgtga cgccgcgcga ggaccggccg gaagcggagc gcgggctgga cctgacgctg 1140  
ccggtgcaca cgttcgacga cgtcacgata ctccggcgacc aggagggacg cgccgtccac 1200  
gacgtccgcc cgggccagcc ggtgcgactg cgtctgatca acaccgactc caaccgcac 1260  
tggttcgccg tcgtcggctc gcccttcgc gtggtggccg tcgacggccg cgacctcaac 1320  
cagccgggcg aggtacgcga ggtcgggctc cgctgcccg ccggaggccg gtacgacctg 1380  
accctggcca tgccggacgc caaggtcacg ctgctgctcg acaacgactc cgaccagggc 1440  
gtcctgctgc gcccgccggg cgtcggcggt ggtgaccgcc cgctgccgga caccgccgac 1500  
tgggccgagt tcgacctgct gggctacggc gagccggcgc ccgtgccgtt cgacgccgac 1560  
gacgccgacc gccacttcac catcgtcctc gaccggggcc tggccatggt cgacggcaag 1620  
cccgcgtacg ccagaccgt cgacggctgc gcacatccct ccgtccccga ccagctcgtc 1680  
cgggaggggg acgtcgtgcg cttcacggtg gtcaaccgga gcctcgaaac ccaccgtgg 1740  
cacctgcacg gccatccggt gctgatcctg tcccgcgacg gccggccgta ctccggcagc 1800  
ccgctgtgga tggacacctt cgacgtgcgg ccgggagagg tgtgggaggt ggcgttccgg 1860  
gcggacaatc cgggtgtctg gatgaaccac tgccacaacc tgccgcacca ggagcagggc 1920  
atgatgctgc ggctcgtcta cgacgggtgtc accacgccct tcgccagcac gagccacgca 1980  
cactga 1986

<210> 34  
<211> 129  
<212> PRT  
<213> Micromonospora sp. strain 046-EC011

<400> 34

Met Thr Ala Asp Leu His Gly Leu Ala Ser Val Arg Tyr Ile Val Asp  
1 5 10 15

Asp Val Ser Ala Ala Ile Glu Phe Tyr Thr Thr His Leu Gly Phe Thr  
20 25 30

Val Ser Thr Ala Phe Pro Pro Ala Phe Ala Asp Val Val Arg Gly Pro  
35 40 45

Leu Arg Leu Leu Leu Ser Gly Pro Thr Ser Ser Gly Ala Arg Val Thr  
50 55 60

Pro Ala Asp Ala Ala Gly Cys Gly Arg Asn Arg Ile His Leu Ile Val  
65 70 75 80

Asp Asp Leu Asp Ala Glu Arg Glu Arg Leu Glu Arg Ala Gly Val Thr

				85						90						95			
Leu	Arg	Ser	Asp	Val	Val	Ala	Gly	Pro	Gly	Gly	Arg	Gln	Phe	Leu	Ile				
			100					105					110						
Ala	Asp	Pro	Ala	Gly	Asn	Leu	Val	Glu	Val	Phe	Glu	Pro	Ala	Ala	Arg				
		115				120						125							

Gly

<210> 35  
 <211> 390  
 <212> DNA  
 <213> Micromonospora sp. strain 046-ECO11

<400> 35  
 atgaccgcag acctgcacgg cctggccagc gtccgctaca tcgtcgacga cgtgtcggcg 60  
 gcgatcgagt tctacaccac ccacctgggt ttcacggtgt cgaccgcgtt cccgccggcc 120  
 ttcgccgacg tgggtgcgcg gccgctgcgg ctctgtctgt ccggggccgac cagctcgggc 180  
 gcccggtca ccccggcgga cgcgccggg tgccggcgca accgcatcca cctgatcgtc 240  
 gacgatctcg acgccgaacg ggagcggctg gagcgcgccg gggtagcgtt gcgcagcgac 300  
 gtcgtggccg ggccgggagg ccgtcagttc ctgatcgccg acccggcggg caacctggtc 360  
 gaggtgttcg agccggcagc ccgcggctga 390

<210> 36  
 <211> 178  
 <212> PRT  
 <213> Micromonospora sp. strain 046-ECO11

<400> 36

Met	Leu	Thr	Ala	Val	Val	Ala	Ser	Pro	His	Ser	Pro	Glu	Asn	Thr	Ser				
1				5				10					15						
Arg	His	Pro	Thr	Gly	Gly	Asp	Ala	Val	Asp	Glu	Ala	Thr	Pro	Arg	Thr				
			20				25						30						
Pro	Val	Ala	Ala	Arg	Pro	Thr	Trp	Ser	Pro	Ala	Thr	Ala	Pro	Val	Trp				
		35				40						45							
Leu	Val	Gly	Val	Leu	Ala	Thr	Leu	Ala	Gly	Ala	Val	Ala	Ala	Glu	Ala				
	50				55						60								
Phe	Thr	Leu	Ala	Ala	Arg	Gly	Phe	Gly	Val	Pro	Met	Glu	Ala	Ala	Gly				
65					70				75						80				
Val	Trp	Glu	Glu	Gln	Ala	Gln	Ala	Ile	Pro	Val	Gly	Ala	Ile	Ala	Arg				
				85				90						95					

Ser Val Val Leu Trp Ser Ile Gly Gly Ile Val Leu Ala Val Val Val  
100 105 110

Ala Arg Arg Ala Arg Arg Pro Val Arg Ala Phe Val Ala Gly Thr Val  
115 120 125

Ala Phe Thr Val Leu Ser Leu Ala Ala Pro Ala Phe Ala Arg Asp Thr  
130 135 140

Pro Val Ser Thr Gln Leu Val Leu Ala Gly Thr His Val Ile Ala Gly  
145 150 155 160

Ala Val Ile Ile Ser Ile Leu Ala Ala Arg Leu Ala Ala Pro Thr Pro  
165 170 175

Pro Arg

<210> 37  
<211> 537  
<212> DNA  
<213> Micromonospora sp. strain 046-EC011

<400> 37  
atgttgactg ccgtcgtggc gtccccgcat tctcccgaga acacatcgag gcacccgacc 60  
ggaggcgacg ccgtggatga ggccactccc cgaactcccg tcgcggcacg gccacactgg 120  
tcgccggcca ccgctccggt gtggctgggtc ggcgtgctgg ccaccctcgc cggggccgtg 180  
gccgcggagg cggtcacgct cgccgcccgg ggcttcggcg taccgatgga ggcggccggc 240  
gtctgggagg agcaggcgca ggcgatcccg gtgggggcca tcgcccgcag cgctgtgctc 300  
tggtcgatcg gcggaatcgt cctggcggtg gtcgtggcgc ggcgggcccg gcggcccgtg 360  
cgtgccttcg tggccggcac cgtcgcgttc accgtgctgt ccctcgccgc gcccgcttc 420  
gcccgggaca ccccggtgtc gacgcagctc gtctcgcgg gcacccacgt gatcgccggc 480  
gccgtgatca tctccatcct ggccgcgcgg ctgcgcgcgc ccaccccgcc ccggtaa 537

<210> 38  
<211> 661  
<212> PRT  
<213> Micromonospora sp. strain 046-EC011

<400> 38

Met Asp Gly Thr Glu Ser Asn Val Thr Gly Phe Pro Asp Leu Leu Ser  
1 5 10 15

Gly Leu Gly Gly Asp Gly Arg Ala Phe Ala Leu Leu His Arg Pro Gly  
20 25 30

Ala Ala Gly Cys Ala Tyr Val Glu Val Leu Thr Gly Glu Val Cys Asp



35	40	45
Val Asp Thr Leu Gly Glu Leu Pro Leu Pro Thr Glu Pro Ala Thr Gly 50 55 60		
Ala Arg His Asp Leu Leu Val Ala Val Pro Tyr Arg Gln Val Thr Glu 65 70 75 80		
Arg Gly Phe Asp Cys His Asp Asp Gly Ala Pro Leu Leu Ala Met Arg 85 90 95		
Val His Glu Gln Phe Gly Leu Asp Arg Gly Gln Ala Leu Ala Gly Leu 100 105 110		
Pro Glu Arg Gly Val Pro Val Thr Asp Ala Asp Phe Asp Leu Ser Asp 115 120 125		
Glu Asp Tyr Ala Ala Ile Val Lys Arg Val Val Gly Asp Glu Ile Gly 130 135 140		
Leu Gly Ala Gly Ser Asn Phe Val Ile Arg Arg Thr Phe Thr Ala Arg 145 150 155 160		
Leu Ala Asp Tyr Ser Ile Ala Thr Glu Leu Ala Leu Phe Arg Arg Leu 165 170 175		
Leu Thr Gly Glu Leu Gly Ser Tyr Trp Thr Phe Leu Phe His Ser Gly 180 185 190		
Ala Gly Thr Phe Ile Gly Ala Ser Pro Glu Arg His Val Ser Met Ile 195 200 205		
Asp Gly Thr Val Ser Met Asn Pro Ile Ser Gly Thr Tyr Arg His Pro 210 215 220		
Pro Asn Gly Pro Ala Val Ser Gly Leu Leu Glu Phe Leu Asn Asp Pro 225 230 235 240		
Lys Glu Ala Asn Glu Leu Tyr Met Val Val Asp Glu Glu Leu Lys Met 245 250 255		
Met Ala Arg Met Cys Ala Ser Gly Gly Gln Val His Gly Pro Phe Leu 260 265 270		
Lys Glu Met Ala Arg Val Thr His Ser Glu Tyr Ile Leu Thr Gly Arg 275 280 285		
Ser Asp Leu Asp Val Arg Asp Val Leu Arg Glu Thr Leu Leu Ala Pro 290 295 300		
Thr Val Thr Gly Ser Pro Ile Glu Asn Ala Phe Arg Val Ile Thr Arg 305 310 315 320		
His Glu Thr Thr Gly Arg Gly Tyr Tyr Gly Gly Val Leu Ala Leu Met 325 330 335		
Gly Arg Asp Ser Ala Gly Ser Arg Thr Leu Asp Ser Ala Ile Met Ile		

340	345	350
Arg Thr Ala Glu Ile Asp Asp Ala Gly Thr Leu Arg Leu Gly Val Gly		
355	360	365
Ala Thr Leu Val Arg Asp Ser Lys Pro Glu Ser Glu Val Ala Glu Thr		
370	375	380
Arg Ala Lys Ala Gly Ala Met Arg Ala Ala Leu Gly Leu Gly Val Asp		
385	390	395
Pro Asp Gly Pro Asp Gly Gly Arg Thr Thr Ala Ala Arg Ala Arg Ser		
	405	410
Ser Leu Ala Thr Asp Pro Arg Val Arg Arg Ala Leu Arg Glu Arg Asn		
	420	425
		430
Thr Thr Leu Ser Arg Phe Trp Leu Asp Gly Ala Glu Arg Arg Thr Pro		
	435	440
		445
Asn Pro Ala Leu Thr Gly Arg Arg Val Leu Val Val Asp Asn Glu Asp		
	450	455
		460
Thr Phe Met Ala Met Leu Asp His Gln Leu Arg Ala Leu Gly Leu Arg		
465	470	475
		480
Ser Ser Ile Ala Arg Phe Asp Ser Arg Leu Arg Pro Asp Gly His Asp		
	485	490
		495
Leu Val Val Val Gly Pro Gly Pro Gly Asp Pro Gly Asp Leu Thr Asp		
	500	505
		510
Pro Arg Met Arg Thr Leu Arg Gly Leu Thr Arg Asp Leu Leu Ala Gly		
	515	520
		525
Thr Val Pro Phe Leu Ser Ile Cys Leu Gly His Gln Val Leu Ala Ala		
	530	535
		540
Glu Leu Gly Phe Pro Leu Ala Arg Arg Ala Val Pro Asn Gln Gly Val		
545	550	555
		560
Gln Lys Arg Ile Asp Leu Phe Gly Arg Pro Glu Leu Val Gly Phe Tyr		
	565	570
		575
Asn Thr Tyr Thr Ala Arg Ser Ala His Asp Val Val Ala Gly Gly Arg		
	580	585
		590
Arg Gly Pro Ile Glu Ile Ser Arg Ser Pro Asp Ser Gly Asp Val His		
	595	600
		605
Ala Leu Arg Gly Pro Gly Phe Arg Ser Val Gln Phe His Leu Glu Ser		
	610	615
		620
Val Leu Thr Gln His Gly Pro Arg Ile Leu Gly Asp Leu Leu Val Ser		
625	630	635
		640
Leu Leu Ala Asp Gly Thr Ala Ala Ala Ala Ala Glu Ala Ala Gly Arg		

645

650

655

Arg Gly Asn Arg Pro  
660

&lt;210&gt; 39

&lt;211&gt; 1986

&lt;212&gt; DNA

&lt;213&gt; Micromonospora sp. strain 046-EC011

&lt;400&gt; 39

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gacggggcgcg	ccttcgcct	gctgcaccgg	cccggcgcgg	ccgggtgcgc	gtacgtggag	120
gttctgaccg	gcgaggtgtg	cgacgtggac	actctcggcg	agctgcccct	gccaccgag	180
ccggcgaccg	gcgcgcgga	cgacctgtc	gtggcggtgc	cgtaccggca	ggtcaccgaa	240
cgggggttcg	actgccacga	cgacggcgcg	ccgctgctcg	cgatgcgcgt	ccacgagcag	300
ttcgggctcg	accgcggaca	ggcgtggcg	ggcctgcccg	aacgcggtgt	gccggtgacc	360
gacgccgact	tcgacctcag	cgacgaggac	tacgccgcga	tcgtcaagcg	ggtggtgggt	420
gacgagatcg	ggctggggcg	cggatccaac	ttcgtcatcc	ggcgacctt	caccgcgcgg	480
ctggccgact	actcgatcgc	cacggaactg	gcgctcttcc	gccggttgct	gaccggcgaa	540
ctgggttctt	actggacgtt	tctgttccac	tcgggcgcgg	gcacgttcat	cggcgcgtca	600
ccggaacgac	acgtcagcat	gatcgacgga	accgtctcga	tgaatcccat	cagcgggacc	660
taccggcacc	ccccgaacgg	cccgccggtt	tccggtctgc	tggaattcct	gaacgacccg	720
aaagaggcta	acgaactcta	catggtcgtc	gacgaggaac	tgaaaatgat	ggcgcggtatg	780
tgcgctccg	gcggccaggt	gcacggcccc	ttcctcaagg	aaatggcgcg	ggtgacgcac	840
tccgagtaca	tcctgaccgg	ccgcagcgac	ctggacgtgc	gcgacgtgct	gcgggagacc	900
ctgctcgcgc	cgacggtcac	cggcagcccc	atcgagaacg	cgttccgggt	catcaccgcg	960
cacgagacga	ccggccgcgg	ctactacggc	ggcgtgctcg	cgttgatggg	ccgtgactcg	1020
gccggcagcc	gtacgctcga	ctcggccatc	atgatccgca	ccgccgagat	cgacgacgcg	1080
ggcacgctgc	gcctggggcgt	cggcgccacc	ctcgtgcggg	actccaagcc	ggagtcggag	1140
gtggccgaga	cgcgggccaa	ggcgggcgcc	atgcgcgcgg	cgctcggcct	cggcgtcgac	1200
ccggacggcc	cggacggcgg	gcggaccacg	gccgcgcggg	ctcgttcgtc	cctggccacc	1260
gacccccggg	tacggcgggc	gttgcgcgag	cgcaacacca	cactgtcgag	gttctggctc	1320
gacggcgcg	agcggcgcac	cccgaaccgg	gcgctgaccg	gacgccgcgt	gctcgtcgtc	1380

gacaacgagg acacgttcat ggccatgctc gaccaccagt tgcggggccct cgggctgcgg 1440  
tcgagcatcg cccgggttca cagccggctg cggccggacg gacacgacct cgtcgtcgtc 1500  
gggtccgggc cgggcgaccc gggcgacctg accgaccgc gtatgcggac cctgcgcggg 1560  
ctcaccgcg acctgctgc cggaacggtg ccgttctctgt ccatctgcct gggccaccag 1620  
gtgctcgccg ccgaactggg gttccccctc gcccggcgcg cggtgcccaa ccagggtgtg 1680  
cagaagcgga tcgacctgtt cggccggccg gaactcgtgg ggttctacaa cacctacacc 1740  
gcccgtccg cgcacgacgt ggtggccggg gcccggcggg gcccgatcga gatcagccgc 1800  
agcccggaca ggggggacgt gcacgcgctg cgcggcccg gattccgttc cgtccagttc 1860  
cacctggagt ccgtctcac ccagcacggc ccacggatcc tgggcgacct gctgggtctcc 1920  
ctgctcgccg acggcacggc cgccgccgcg gccgaggcgg cgggccggcg cgggaaccgc 1980  
ccgtga. 1986

<210> 40  
<211> 427  
<212> PRT  
<213> Micromonospora sp. strain 046-EC011

<400> 40

Val Lys Thr Thr Val Asp Val Leu Val Gln Lys Tyr Gly Gly Thr Ser  
1 5 10 15  
Leu Gln Thr Leu Asp Arg Val Arg His Ala Ala Leu Arg Ile Ala Glu  
20 25 30  
Ala Arg Arg His Gly Ser Ala Val Thr Val Val Val Ser Ala Arg Gly  
35 40 45  
Ser Arg Thr Asp Asp Leu Leu Arg Leu Ala Ala Asp Val Gly Ala Ala  
50 55 60  
Gly Pro Ser Arg Glu Leu Asp Gln Leu Leu Ala Val Gly Glu Ser Glu  
65 70 75 80  
Ser Ala Ala Leu Met Ala Leu Ala Leu Thr Gly Leu Gly Val Pro Ala  
85 90 95  
Val Ser Leu Thr Gly His Gln Ala Glu Ile His Thr Thr Asp Arg His  
100 105 110  
Gly Asp Ala Leu Ile Ser Arg Ile Gly Ala Ala Arg Val Glu Ala Ala  
115 120 125  
Leu Gly Arg Gly Glu Val Ala Val Val Thr Gly Phe Gln Gly Ile Asp  
130 135 140

Arg Ala Gly Asp Val Ala Thr Leu Gly Arg Gly Gly Ser Asp Thr Thr  
 145 150 155 160  
 Ala Val Ala Leu Ala Ala Arg Leu Arg Ala Ser Ala Cys Glu Ile Tyr  
 165 170 175  
 Thr Asp Val Asp Gly Val Phe Ser Ala Asp Pro Arg Ile Leu Pro Ala  
 180 185 190  
 Ala Arg Cys Leu Pro Trp Val Glu Pro Gly Val Met Ala Glu Met Ala  
 195 200 205  
 Phe Ala Gly Ala Arg Val Leu His Thr Arg Cys Ile Glu Leu Ala Ala  
 210 215 220  
 Met Glu Gly Val Glu Val Arg Val Arg Asn Ala Ser Ser Gln Ala Pro  
 225 230 235 240  
 Gly Thr Ile Val Val Asp Arg Pro Asp Asp Arg Pro Leu Glu Thr Arg  
 245 250 255  
 Arg Ala Val Val Ala Val Thr His Asp Thr Asp Val Val Arg Val Leu  
 260 265 270  
 Val His Cys Arg Asp Gly Arg Arg Asp Met Ala Pro Asp Val Phe Glu  
 275 280 285  
 Val Leu Ala Ala His Gly Ala Val Ala Asp Leu Val Ala Arg Ser Gly  
 290 295 300  
 Pro Tyr Glu Ser Glu Phe Arg Met Gly Phe Thr Ile Arg Arg Ser Gln  
 305 310 315 320  
 Ala Glu Ala Val Arg Thr Ala Leu His Asp Leu Thr Ala Ser Phe Asp  
 325 330 335  
 Gly Gly Val His Phe Asp Glu Asn Val Gly Lys Val Ser Val Val Gly  
 340 345 350  
 Met Gly Leu Leu Ser Arg Pro Glu His Thr Ala Arg Leu Met Ala Ala  
 355 360 365  
 Leu Ala Ala Ala Gly Ile Ser Thr Ser Trp Ile Ser Thr Ser Gln Met  
 370 375 380  
 Arg Leu Ser Val Ile Val Ser Arg Asp Arg Thr Val Asp Ala Val Glu  
 385 390 395 400  
 Ala Leu His Arg Ala Phe Arg Leu Asp Arg Ser Glu Pro Ala Asp Ala  
 405 410 415  
 Thr Ser Leu Thr Ser Arg Arg Ser Ala Thr Ala  
 420 425

<210> 41  
 <211> 1284  
 <212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 41

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acagtggtcg tgtcggcgcg cggcagccgg accgacgacc tgctgcggct ggcgcccgac      180
gtcggcgccg cgggtccgtc ccgggaactc gaccagttgc tcgcagtcgg cgagtccgag      240
tcggcggcgc tgatggcgct ggcgttgacc gggctgggag tgccggccgt ctcgctgacc      300
gggcaccagg cggagatcca caccaccgac cggcacggcg acgcgctgat ctcgcggtac      360
ggggcggcgc ggggtggaagc ggcgctgggc cgtggcgagg tcgccgtggt caccggattc      420
cagggcatcg accgggccgg tgacgtcgcc acgctggggc gcggcggtc cgacacgaca      480
gcggtggcgc tcggggcccg gctccgcgcg tcggcgtgcg agatctacac cgacgtggac      540
ggcgtcttca gcgccgacc ccgcctcctt ccggcggcgc gttgcctgcc gtgggtggag      600
cccggcgta tggcggagat ggcgttcgcc ggcgcgcggg tcctgcacac ccgatgcac      660
gagctggccg ccatggaagg ggtcgaagtg cgcgtgcgca acgcgtcgtc gcaggcgccc      720
ggaacgatag tcgtggaccg gcccgacgac cggccgctgg agaccggcg ggccgtggtg      780
gcggtcacc accgacacga tgcgtccgc gtgctggtgc actgccgcga cggccgccgg      840
gacatggcac ccgacgtgtt cgaggtgctg gccgcccatt gggcggtggc ggacctggtg      900
gcccggtccg ggcctacga gagcgagttc cggatggggg tcaccatccg ccgcagccag      960
gccgaagcgg tcgggaccgc gctgcacgac ctaccgcgt ccttcgacgg cggggtccac     1020
ttcgacgaga acgtcggcaa ggtgtccgtg gtcggcatgg gcctgctcag cgcgcccgag     1080
cacacggccc ggctgatggc ggcgctggcc ggcgcgggga tctcgacgag ctggatctcc     1140
acctcccaga tcgggtgtc ggtgatcgtg tcgcgggacc gcaccgtcga cgcgctcga      1200
gccctgcacc gcgcgttcgg cctggaccgg tccgagccgg cggacgccac gtccctgacc     1260
tcccgccgtt ccgccaccgc ctga                                     1284
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<210> 42

<211> 274

<212> PRT

<213> Micromonospora sp. strain 046-EC011

<400> 42

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Val Ala Val Leu Asn Ala Ser Phe Ala Arg Gly Leu Arg Leu Arg Arg
1           5           10           15
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Leu Phe Arg Arg Gly Asp Gly Arg Leu Leu Val Val Pro Leu Asp His  
 20 25 30  
 Ser Val Thr Asp Gly Pro Leu Arg Arg Gly Asp Leu Asn Ser Leu Leu  
 35 40 45  
 Gly Glu Leu Ala Gly Thr Gly Val Asp Ala Val Val Leu His Lys Gly  
 50 55 60  
 Ser Leu Arg His Val Asp His Gly Trp Phe Gly Asp Met Ser Leu Ile  
 65 70 75 80  
 Val His Leu Ser Val Ser Thr Arg His Ala Pro Asp Pro Asp Ala Lys  
 85 90 95  
 Tyr Leu Val Ala His Val Glu Glu Ala Leu Arg Leu Gly Ala Asp Ala  
 100 105 110  
 Val Ser Val His Val Asn Leu Gly Ser Pro Gln Glu Ala Arg Gln Ile  
 115 120 125  
 Ala Asp Leu Ala Ala Val Ala Gly Glu Cys Asp Arg Trp Asn Val Pro  
 130 135 140  
 Leu Leu Ala Met Val Tyr Ala Arg Gly Pro Gln Ile Thr Asp Ser Arg  
 145 150 155 160  
 Ala Pro Glu Leu Val Ala His Ala Ala Thr Leu Ala Ala Asp Leu Gly  
 165 170 175  
 Ala Asp Ile Val Lys Thr Asp Tyr Val Gly Thr Pro Glu Gln Met Ala  
 180 185 190  
 Glu Val Val Arg Gly Cys Pro Ile Pro Leu Ile Val Ala Gly Gly Pro  
 195 200 205  
 Arg Ser Ala Asp Thr Pro Thr Val Leu Ala Tyr Val Ser Asp Ala Leu  
 210 215 220  
 Arg Gly Gly Val Ala Gly Met Ala Met Gly Arg Asn Val Phe Gln Ala  
 225 230 235 240  
 Glu Gln Pro Gly Leu Met Ala Ala Ala Val Ala Arg Leu Val His Glu  
 245 250 255  
 Pro Arg His Val Pro Asp Arg Tyr Asp Val Asp Asp Arg Leu Ala Leu  
 260 265 270

Thr Ser

<210> 43  
 <211> 825  
 <212> DNA  
 <213> Micromonospora sp. strain 046-EC011

<400> 43  
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 ggcgacggac gcctgctcgt cgtcccgcctc gaccactccg tcaccgacgg gccgctgcgc 120  
 cgcggcgacc tgaactcgct gctcgggtgag ctgcgccgga ccggcgtgga cgccgtgggtg 180  
 ctgcacaagg gcagcctgcg gcacgtcgac cacggctggt tcggcgacat gtcgctgac 240  
 gtgcatctga gcgtgagcac ccggcacgcc ccggacccgg acgcgaagta cctggctgcg 300  
 cacgtggagg aggcgctgcg gctggggcgcc gacgcggtca gcgtgcacgt caacctcggc 360  
 tcaccgcagg aggcgcggca gatcgccgac ctggcggcgg tggcggggga gtgcgaccgc 420  
 tggaacgtcc cgctgctggc catggtgtac gcccgcgggc cgcagatcac cgactcccgg 480  
 gcaccggagc tgggtggcgca cgccgcgacg ctgcgccgga acctcggcgc cgacatcgct 540  
 aagaccgact acgtgggcac gcccgagcag atggccgagg tgggtgcgcgg ctgcccgatc 600  
 ccgctgatcg tggccggcgg cccgcgctcg gccgacactc cgacggtgct cgcctacgct 660  
 tcggacgcgc tgcgcggcgg cgtggccggg atggccatgg gccgcaacgt gttccaggcc 720  
 gagcagcccg gcctgatggc cgccgcgctg gcacggctgg tgcacgagcc acggcacgtg 780  
 ccggaccggt acgacgtcga cgaccggctc gcccttaagt cctga 825

<210> 44  
 <211> 367  
 <212> PRT  
 <213> Micromonospora sp. strain 046-EC011

<400> 44

Val	Lys	Leu	Cys	Trp	Leu	Asp	Ile	Arg	Asn	Val	Asn	Gly	Ala	Lys	Glu
1				5					10					15	
Ala	Ile	Val	Glu	Glu	Ala	Val	His	Gln	Arg	Val	Asp	Ala	Val	Val	Ala
			20					25					30		
Ala	Asp	Pro	Ala	Asp	Leu	Glu	Thr	Leu	Pro	Pro	Thr	Val	Lys	Lys	Val
		35					40					45			
Leu	Phe	Pro	Gln	Gly	Gly	Pro	Leu	Pro	Glu	Lys	Leu	Glu	Pro	Ala	Asp
	50					55					60				
Leu	Val	Ile	Val	Glu	Pro	Ala	Arg	His	Gly	Glu	Pro	Ala	Glu	Leu	Ala
65				70					75					80	
Ala	Arg	Tyr	Pro	Glu	Val	Glu	Phe	Gly	Arg	Phe	Val	Glu	Ile	Val	Asp
			85					90						95	
Ala	Asp	Ser	Leu	Glu	Asp	Ala	Cys	Arg	Ser	Ala	Arg	His	Asp	Arg	Trp
			100					105						110	



Ser Leu Leu Tyr Phe Arg Asp Pro Thr Lys Ile Pro Leu Glu Ile Val  
 115 120 125

Leu Ala Ala Ala Ala Gly Ala Glu Gly Ser Ile Ile Thr Gln Val Ala  
 130 135 140

Asp Val Glu Glu Ala Glu Ile Val Phe Gly Val Leu Glu His Gly Ser  
 145 150 155 160

Asp Gly Val Met Leu Ala Pro Arg Ala Val Gly Glu Ala Thr Glu Leu  
 165 170 175

Arg Thr Ala Ala Val Ser Thr Ala Ala Asp Leu Ser Leu Val Glu Leu  
 180 185 190

Glu Val Thr Gly Ile Arg Arg Val Gly Met Gly Glu Arg Ala Cys Val  
 195 200 205

Asp Thr Cys Thr Asn Phe Arg Leu Asp Glu Gly Ile Leu Val Gly Ser  
 210 215 220

His Ser Thr Gly Met Ile Leu Cys Cys Ser Glu Thr His Pro Leu Pro  
 225 230 235 240

Tyr Met Pro Thr Arg Pro Phe Arg Val Asn Ala Gly Ala Leu His Ser  
 245 250 255

Tyr Thr Leu Ser Ala Gly Gly Arg Thr Asn Tyr Leu Ser Glu Leu Val  
 260 265 270

Ser Gly Gly Arg Val Leu Ala Val Asp Ser Gln Gly Lys Ser Arg Val  
 275 280 285

Val Thr Val Gly Arg Val Lys Ile Glu Thr Arg Pro Leu Leu Ala Ile  
 290 295 300

Asp Ala Val Ser Pro Ser Gly Thr Arg Val Asn Leu Ile Val Gln Asp  
 305 310 315 320

Asp Trp His Val Arg Val Leu Gly Pro Gly Gly Thr Val Leu Asn Val  
 325 330 335

Thr Glu Leu Thr Ala Gly Thr Lys Val Leu Gly Tyr Leu Pro Val Glu  
 340 345 350

Lys Arg His Val Gly Tyr Pro Ile Asp Glu Phe Cys Ile Glu Lys  
 355 360 365

<210> 45

<211> 1104

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 45

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cttccccga cggatgaagaa ggtgctgttc ccgcagggcg ggccgctgcc ggagaagctg 180  
gaaccggccg acctggtgat cgtcgagccg gcccggcacg gcgagcccg cgagctggcg 240  
gcccgggtacc cggaggtgga gttcggcccg ttcgtcgaga tcgtcgacgc ggacagcctg 300  
gaggacgcct gccgggtccgc gcgccacgac cgggtggagcc tgctgtactt ccgcgacccc 360  
accaagatcc cgctggagat cgtgctggcg gccgcggcgg gcgcggaggg cagcatcatc 420  
accaggtcg ccgacgtcga ggaggcggag atcgtcttcg gcgtcctgga gcacggctcg 480  
gacggagtga tgctggcgcc ccgcgccgtg ggggaggcca ccgagctcg gaccgcccg 540  
gtgagcacgg cggcggacct gtcgctcgtg gagctggagg tcaccggcat ccggcgggtg 600  
ggcatggcg agcgcgcctg cgtcgacacg tgcacgaact tccgtctgga cgaggcatc 660  
ctggctcggct cgcactccac cggcatgac ctgtgctgca gcgagacgca tccgtgccg 720  
tacatgccga cccggccgtt ccgggtcaac gccggcgcgc tgcaactcgt cagctctcc 780  
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gactcgcagg ggaagtcccg cgtcgtcaca gtgggacggg tcaagatcga gacgcgtccg 900  
ctgctggcga tcgacgcggt ctccccctcc gggacacgcg tcaacctcat cgtccaggac 960  
gactggcacg tgcgctgct cgggcgggc ggcaccgtgc tcaacgtgac cgagctgacc 1020  
gccggcacga aggtgctcgg ttacctgccg gtggagaagc ggcacgtcgg ctacccgatc 1080  
gacgagttct gcatcgagaa gtga 1104

<210> 46  
<211> 253  
<212> PRT  
<213> Micromonospora sp. strain 046-EC011

<400> 46

Met Thr Ala Gln Pro Val Leu Asp Phe His Val Arg Leu Ala Pro Arg  
1 5 10 15

Pro Gly Ala Arg Glu Arg Leu Leu Ala Ala Leu Arg Glu Cys Gly Leu  
20 25 30

Ala Arg Ala Val Val Cys Ala Gly Gly Thr Ile Asp Leu Asp Arg Leu  
35 40 45

Ser Arg Gln Leu Val Thr Gly Gly His Val Glu Thr Asp Ala Asp Asn  
50 55 60

Asp Ala Val Ala Ala Ala Cys Ala Gly Thr Asp Gly Arg Leu Val Pro

65	70	75	80
Phe Phe Phe Ala Asn Pro His Arg Pro Ala Glu Ala Tyr Arg Ala Arg	85	90	95
Ala Ala Glu Phe Arg Gly Leu Glu Ile Ser Pro Ala Val His Gly Val	100	105	110
Ala Leu Thr Asp Pro Arg Val Ala Asp Leu Val Ala Val Ala Ala Glu	115	120	125
Phe Asp His Pro Val Tyr Val Val Cys Leu Asp Arg Pro Gly Ala Gly	130	135	140
Val Ala Asp Leu Val Gly Leu Ser Arg Arg Phe Pro Gln Val Ser Phe	145	150	155
Val Leu Gly His Ser Gly Val Gly Asn Ile Asp Leu Tyr Ala Leu Thr	165	170	175
Leu Ile Gln Asp Glu Pro Asn Ile Ser Leu Glu Thr Ser Gly Gly Tyr	180	185	190
Thr Cys Val Ala Glu Ala Ala Leu Arg Arg Leu Gly Asp Asp Arg Val	195	200	205
Val Phe Gly Ser Glu Tyr Pro Leu Gln His Pro Ala Val Glu Leu Ala	210	215	220
Lys Phe Gln Ala Leu Arg Leu Pro Pro Glu Arg Trp Arg Arg Ile Ala	225	230	235
Trp Asp Asn Ala His Arg Leu Leu Gly Glu Glu Lys Arg	245	250	

<210> 47  
 <211> 762  
 <212> DNA  
 <213> Micromonospora sp. strain 046-EC011

<400> 47  
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 ggcaccatcg acctggaccg gctgtcccgc cagctcgtca ccggcggcca cgtcgagacc 180  
 gacgccgaca acgacgcggt ggccggcgcc tcgccggca ccgacggccg gctggtgccg 240  
 ttctttcttcg ccaaccgcga ccggccggcc gaggcgtacc gggccgcgc cgccgagttc 300  
 cgcggcctgg agatctcacc cgccgtccac ggcgtcggcc tgaccgacct gcgggtcgcc 360  
 gacctcgtgg ccgtggcgcc ggagttcgac catccggtgt acgtggtctg cctggaccga 420  
 cccggcgcg gcggtggcca cctggtcggc ctgagccgcc ggttcccga ggtgagcttc 480

gtgctcgggc	acagcggcgt	cggcaacatc	gacctctacg	cctgaccct	gatccaggac	540
gagccgaaca	tctcgctgga	gacctccggc	ggctacacct	gcgtggccga	ggcggcgcta	600
cgcgcctcg	gcgacgaccg	ggtggtgttc	ggctccgagt	acccgctgca	gcacccggcc	660
gtggaactgg	ccaagttcca	ggcgttgcga	ctgccgccgg	agcggtggcg	gcggatcgcc	720
tgggacaacg	cgcatcgact	gctaggagag	gagaagcggg	ga		762

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<210> 48
<211> 438
<212> PRT
<213> Micromonospora sp. strain 046-EC011
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<400> 48

Val Ser Glu Pro Ser Ser Ser Leu Pro Arg Leu Gly Gln Trp His Gly  
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Leu Glu Asp Leu Arg Arg Leu Gln Glu Lys Gln Leu Ala Glu Thr Phe  
20 25 30

Thr Trp Ala Ala Arg Ser Pro Phe Tyr Arg Ala Arg Leu Ala Ser Gly  
35 40 45

Ala Pro Pro Val Thr Pro Ala Asp Leu Ala Asp Leu Pro Leu Thr Thr  
50 55 60

Lys Gln Asp Leu Arg Asp Asn Tyr Pro Phe Gly Met Leu Ala Val Pro  
65 70 75 80

Arg Glu Arg Leu Ala Thr Tyr His Glu Ser Ser Gly Thr Ala Gly Lys  
85 90 95

Pro Thr Pro Ser Tyr Tyr Thr Ala Glu Asp Trp Thr Asp Leu Ala Glu  
100 105 110

Arg Phe Ala Arg. Lys Trp Ile Gly Met Ser Ala Asp Asp Val Phe Leu  
115 120 125

Val Arg Thr Pro Tyr Ala Leu Leu Leu Thr Gly His Leu Ala His Ala  
130 135 140

Ala Ala Arg Leu Arg Gly Ala Thr Val Val Pro Gly Asp Asn Arg Ser  
145 150 155 160

Leu Ala Met Pro Tyr Ala Arg Val Val Arg Val Met His Asp Leu Asp  
165 170 175

Val Thr Leu Thr Trp Ser Val Pro Thr Glu Cys Leu Ile Trp Ala Ala  
180 185 190

Ala Ala Ile Ala Ala Gly His Arg Pro Asp Ile Asp Phe Pro Ala Leu  
195 200 205

Arg Ala Leu Phe Val Gly Gly Glu Pro Met Thr Asp Ala Arg Arg Arg  
 210 215 220  
 Arg Ile Ser Arg Leu Trp Gly Val Pro Val Ile Glu Glu Tyr Gly Ser  
 225 230 235 240  
 Thr Glu Thr Gly Ser Leu Ala Gly Glu Cys Pro Glu Gly Arg Leu His  
 245 250 255  
 Leu Trp Ala Asp Arg Ala Leu Phe Glu Val Tyr Asp Pro Asp Thr Gly  
 260 265 270  
 Ala Val Arg Ala Asp Gly Asp Gly Gln Leu Val Val Thr Pro Leu Phe  
 275 280 285  
 Arg Glu Ala Met Pro Leu Leu Arg Tyr Asn Leu Glu Asp Asn Val Ser  
 290 295 300  
 Val Ser Tyr Asp Asp Cys Gly Cys Gly Trp Lys Leu Pro Thr Val Arg  
 305 310 315 320  
 Val Leu Gly Arg Ser Ala Phe Gly Tyr Arg Val Gly Gly Thr Thr Ile  
 325 330 335  
 Thr Gln His Gln Leu Glu Glu Leu Val Phe Ser Leu Pro Glu Ala His  
 340 345 350  
 Arg Val Met Phe Trp Arg Ala Lys Ala Glu Pro Ala Leu Leu Arg Val  
 355 360 365  
 Glu Ile Glu Val Ala Ala Ala His Arg Val Ala Ala Glu Ala Glu Leu  
 370 375 380  
 Thr Ala Ala Ile Arg Ala Ala Phe Gly Val Asp Ser Glu Val Thr Gly  
 385 390 395 400  
 Leu Ala Pro Gly Thr Leu Ile Pro Leu Asp Ala Leu Thr Ser Met Pro  
 405 410 415  
 Asp Val Val Lys Pro Arg Ser Leu Phe Gly Pro Asp Glu Asp Trp Ser  
 420 425 430  
 Lys Ala Leu Leu Tyr Tyr  
 435

<210> 49

<211> 1317

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 49

gtgagcgagc caagtctgag cctgccccgg ctgggccagt ggcacggcct cgaggacctg 60

cggcgcctcc aggagaagca actggcggag acgttcacct gggcgccccg gtcgccgttc 120

taccgggcgc ggctggcctc cggcgcgccg ccggtgacgc ccgccgacct ggccgacctg 180

ccgctgacca ccaagcagga cctgcgggac aactaccctc tcggcatgct cgccgtgccc 240  
 cgogaacggc tggcgaccta ccacgagtcg agcgggaccg ccgggaagcc caccctcc 300  
 tactacaccg cggaggactg gaccgacctg gcggagcgct tcgcccga gtggatcggc 360  
 atgtccgccc acgacgtctt cctgggtccg acgccgtacg cgctgctgct gaccgggcat 420  
 ctgccccacg ccgcagcccg gctgcgtggg gccacgggtg tacctggcga caaccggctg 480  
 ctggcgatgc cgtacgcccg ggtgggtccg gtgatgcacg acctggacgt cacgctcacc 540  
 tggtcggtgc cgacggagtg cctgatctgg gccgcccgcg cgatcgcggc cgggcaccgg 600  
 cccgacatcg acttcccggc gctgcgcgcg ctgttcgctg gcggcgagcc gatgaccgac 660  
 gcccgccggc ggccgatcag ccgcctgtgg ggggtgccgg tcatcgagga gtacggctcg 720  
 acggagaccg gcagcctggc cggggagtgcc cccgagggac gcctgcacct gtgggccgac 780  
 cgggcgctgt tcgaggtgta cgaccgggac accggcgccg tccgcgcgga cggcgacggc 840  
 cagctcgtgg tcacgccgct gttccgggag gcgatgccgc tgctgcggta caacctggag 900  
 gacaacgtgt cggctctcta cgacgactgc ggatgcggct ggaagctgcc caccgtgcgg 960  
 gtgctcggcc ggtcggcggt cggctaccgg gtcggcggca ccaccatcac ccagcaccag 1020  
 ctggaggaac tgggtcttct cctgccggag gcgcaccggg tgatgttctg gcgggccaaag 1080  
 gcggagccgg cgctgttgcg ggtcgagatc gaggtggccg ccgcgcaccg ggtcgcgcc 1140  
 gaggcggagc tgaccgccgc gatccgggccc gccttcggcg tggacagcga ggtcaccggc 1200  
 ctggcgccgg gaacctgat cccgctcgac gcgctgacca gcatgccgga cgtggtgaag 1260  
 ccacgcagcc tggtcgggtc ggacgaggac tggagcaaag cgctcctcta ctactga 1317

<210> 50

<211> 396

<212> PRT

<213> Micromonospora sp. strain 046-EC011

<400> 50

Met Pro Gln Met Arg Val Ala Val Ala Gly Ala Gly Ile Ala Gly Leu  
1 5 10 15

Ala Phe Ala Ala Ala Leu Arg Arg Thr Gly Ile Asp Cys His Val Tyr  
20 25 30

Glu Gln Ala Asp Gln Leu Met Glu Val Gly Ala Gly Val Gln Val Ala  
35 40 45

Pro Asn Ala Thr Arg Leu Leu His Arg Leu Gly Leu Arg Asp Arg Leu  
50 55 60

Arg Thr Val Ala Val Ala Pro Gln Ala Ile Glu Met Arg Arg Trp Asp  
 65 70 75 80  
 Asp Gly Thr Leu Leu Gln Arg Thr Gln Leu Gly Ser Val Cys Gly Arg  
 85 90 95  
 Arg Phe Gly Ala Pro Tyr Tyr Val Val His Arg Ala Asp Leu His Ser  
 100 105 110  
 Ser Leu Leu Ser Leu Val Pro Pro Asp Arg Val His Leu Gly Ala Arg  
 115 120 125  
 Leu Thr Ala Val Thr Gln Thr Ala Asp Glu Ala Tyr Leu His Leu Ser  
 130 135 140  
 Asn Gly Thr Thr Val Ala Ala Asp Leu Val Val Gly Ala Asp Gly Ile  
 145 150 155 160  
 His Ser Val Ala Arg Glu Gln Ile Val Ala Asp Arg Pro Arg Phe Ser  
 165 170 175  
 Gly Gln Ser Ile Tyr Arg Gly Leu Val Pro Ala Glu Arg Val Pro Phe  
 180 185 190  
 Leu Leu Thr Glu Pro Arg Val Gln Leu Trp Phe Gly Pro Asp Gln His  
 195 200 205  
 Cys Val Cys Tyr Pro Val Ser Ala Gly Arg Gln Val Ser Phe Gly Ala  
 210 215 220  
 Thr Val Pro Ala Thr Asp Trp Arg Gln Glu Ser Trp Ser Gly Arg Gly  
 225 230 235 240  
 Asp Val Thr Gln Leu Ala Ala Ala Tyr Ala Gly Trp His Pro Asp Val  
 245 250 255  
 Thr Arg Leu Ile Ala Ala Ala Asp Arg Val Gly Arg Trp Ala Leu His  
 260 265 270  
 Asp Arg Asp Ser Ile Asp Arg Leu Ser Ala Gly Arg Val Thr Leu Ile  
 275 280 285  
 Gly Asp Ala Ala His Pro Met Leu Pro Phe Gln Ala Gln Gly Ala Asn  
 290 295 300  
 Gln Ala Val Glu Asp Ala Val Val Leu Ala Val Cys Leu Ala Gly Val  
 305 310 315 320  
 Glu Pro Ala Gly Leu Gly Ala Ala Leu Arg Arg Tyr Glu Arg Ile Arg  
 325 330 335  
 Leu Pro Arg Thr Thr Arg Ile Gln Arg Gln Ser Arg Ala Asn Ala Glu  
 340 345 350  
 Met Phe His Leu Ala Asp Gly Ala Asp Gln Arg Arg Arg Asp Val Ala  
 355 360 365

Ala Gln Ser Ser Ser Gly Leu Asp Arg His Glu Trp Leu Phe Gly Tyr  
 370 375 380

Asp Ala Glu Lys Ala Thr Thr Thr Ser Gly Ser Ala  
 385 390 395

<210> 51  
 <211> 1191  
 <212> DNA  
 <213> Micromonospora sp. strain 046-EC011

<400> 51  
 atgccgcaga tgaggggtcgc cgtggccggc gccggcatcg ccgggctcgc cttcgccgcc 60  
 gccctgcgcc ggaccgggat cgactgccac gtgtacgaac aggccgacca gtcctatggag 120  
 gtgggcgcgg gcgtgcaggt cgcgccgaac gccaccggc tgctgcaccg gctgggcctg 180  
 cgtgaccgcc tgcgtacggg ggctgtcgcg ccgcaggcga tcgagatgcg ccgctgggac 240  
 gacggcacgc tgctgcaacg caccagctg ggcagcgtgt gcggacgccg cttcggcgcg 300  
 ccgtactacg tgggtgcaccg cgcggacctg cacagcagcc tgctgtcgtc ggtgccgccg 360  
 gaccgggtgc acctggggcg ccgcctcacc gccgtgacgc agaccgccga cgaggcgtac 420  
 ctgcacctgt ccaacggcac cagggtcgcg gcggatctcg tcgtgggcgc cgacggcatc 480  
 cactcgggtc cgcgggagca gatcgtggcg gaccggccgc gcttctccgg acagtccatc 540  
 taccgcgggc tgggtgccggc cgagcgggtg ccgttctcgc tcaccgaacc ccgggtgcag 600  
 ttgtgggttc ggccggacca gcaactgcgc tgctaccggg tgcccgccgg ccggcaggtg 660  
 agcttcggcg cgacgggtgcc cgcaccgac tggcggcagg agtcgtggtc gggccggggc 720  
 gacgtgacgc aactcgcggc cgcgtacgcg ggctggcacc cggacgtcac ccggctgac 780  
 gccgcggccg accgggtcgg cagggtggcg ctgcacgacc gggacagcat cgaccggctc 840  
 agcgcgggac ggggtgacct gatcggcgac gccgcgcacc cgatgctgcc gttccaggcg 900  
 cagggcgcg accaggccgt cgaggacgcg gtgggtgctc cggctctgcct ggccggcgtg 960  
 gaaccggcg ggctgggcgc cgcgtcgcg cgctacgaac ggatccgcct gccccggacc 1020  
 acccgatcc agcggcagtc ccgggccaac gccgagatgt tccacctggc cgacggcgcc 1080  
 gaccagcgc gccgggacgt cgcgcacaa tcctcgtccg gcctggaccg ccacgaatgg 1140  
 ctcttcgggt acgacgccga gaaagccacc acgaccagcg ggagcgctg a 1191

<210> 52  
 <211> 261  
 <212> PRT



<213> Micromonospora sp. strain 046-EC011

<400> 52

Met Glu Leu Thr Gly Ile Glu Ser Lys Val Ala Leu Val Thr Gly Ala  
1 5 10 15  
Gly Gln Gly Ile Gly Ala Ala Val Ala Gly Val Leu Ala Arg Ala Gly  
20 25 30  
Ala Gln Val Ala Ala Val Asp Arg Asn Ala Glu Ala Leu Thr Thr Val  
35 40 45  
Val Thr Lys Leu Ala Ala Glu Gly Asp Ser Ala Arg Ala Tyr Cys Val  
50 55 60  
Asp Val Cys Asp Ser Glu Ala Val Asp Ala Leu Val Arg Arg Val Glu  
65 70 75 80  
Asp Glu Met Gly Pro Val Ala Ile Leu Val Asn Ala Ala Gly Val Leu  
85 90 95  
His Thr Gly Arg Val Val Glu Leu Ser Asp Arg Gln Trp Arg Arg Thr  
100 105 110  
Phe Ser Val Asn Ala Asp Gly Val Phe His Val Ser Arg Ala Val Ala  
115 120 125  
Arg Arg Met Val Gly Arg Arg Arg Gly Ala Ile Val Thr Val Ala Ser  
130 135 140  
Asn Ala Ala Gly Val Pro Arg Thr Glu Met Ala Ala Tyr Ala Ala Ser  
145 150 155 160  
Lys Ala Ala Ser Ala Gln Phe Thr Arg Cys Leu Gly Leu Glu Leu Ser  
165 170 175  
Gly Tyr Gly Ile Arg Cys Asn Val Val Ser Pro Gly Ser Thr Asp Thr  
180 185 190  
Pro Met Leu Arg Ala Met Leu Gly Glu Gly Ala Asp Pro Ser Ala Val  
195 200 205  
Ile Glu Gly Thr Pro Gly Ala Tyr Arg Val Gly Ile Pro Leu Arg Lys  
210 215 220  
Leu Ala Gln Pro Arg Asp Val Ala Glu Ala Val Ala Tyr Leu Val Ser  
225 230 235 240  
Asp Gln Ala Gly His Val Thr Met His Asp Leu Tyr Val Asp Gly Gly  
245 250 255  
Ala Ala Leu His Val  
260

<210> 53

<211> 786

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 53

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atggaactga ccggaatcga gtcgaaggtc gccctgggtca cgggcgcggg gcagggcatc 60
ggcgccgccc tggccgggtgt cctggcgagg gcgggcgcgc aggtggcggc ggtggaccgc 120
aacgccgagg cgctgaccac cgctcgtgacg aagctcgccg ccgagggcga ctcggcgcgc 180
gcctactgcg tcgacgtgtg cgacagcgag gcggtggacg cgctggtgcg ccgggtcgag 240
gacgagatgg ggccggtcgc catcctggtc aacgccgccg gcgtgctgca caccggacgg 300
gtcgtcgagc tgtcggaccg gcagtggcgc cggaccttct cggtgaacgc cgacggcgtg 360
ttccacgtgt cccgggcggg ggcgcggcgg atggtgggcc gccgtcgtgg cgcgatcgtc 420
accgtggcgt cgaacgccgc cggggtgccg cgtaccgaga tggccgcgta cgccgcctcc 480
aaggccgcgt ccgcgcagtt caccgcgtgc ctggggcttg agctgtccgg ctacggcatc 540
cggtgcaacg tgggtctgcc cggctccacc gacaccccca tgctgcgggc catgctcggc 600
gagggcgccc acccgagcgc ggtgatcgag ggcacgccgg gcgcgtaccg cgtcggcatc 660
ccgctgcgca agctggccca gccgcgcgac gtggccgagg cggtcgccta tctggtgtcc 720
gaccaggcgg gccacgtgac catgcacgac ctgtacgtcg acggcggcgc ggccctgcac 780
gtgtga 786
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<210> 54

<211> 224

<212> PRT

<213> Micromonospora sp. strain 046-EC011

<400> 54

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Met Ala Met Thr Pro Ile Ala Pro Tyr Arg Met Pro Gly Asp Gly Asp
1           5           10          15
Leu Pro Gly Thr Ala Leu Pro Trp Arg Pro His Pro Asp Arg Ala Ala
20          25          30
Val Leu Val His Asp Leu Gln Arg Tyr Phe Leu Arg Pro Phe Glu Ala
35          40          45
Gly Glu Ser Pro Met Ala Glu Leu Leu Pro Asn Val Ala Lys Leu Leu
50          55          60
Ala Thr Ala Arg Ala Ala Gly Val Pro Val Leu Tyr Thr Ala Gln Pro
65          70          75          80
Gly Gly Met Ser Arg Gln Asp Arg Gly Leu Leu His Asp Leu Trp Gly
85          90          95
```

Pro Gly Met Ser Ser Ala Glu Asp Asp Arg Gly Ile Val Asp Asp Val  
100 105 110

Ala Pro Gln Pro Gly Asp Thr Val Leu Thr Lys Trp Arg Tyr Ser Ala  
115 120 125

Phe Phe Arg Ser Asp Leu Glu Glu Arg Leu Arg Gly Ala Gly Arg Asp  
130 135 140

Gln Leu Val Val Cys Gly Val Tyr Ala His Met Gly Cys Leu Ile Thr  
145 150 155 160

Ala Cys Asp Ala Phe Ser Arg Asp Ile Glu Ala Phe Leu Val Ala Asp  
165 170 175

Ala Leu Ala Asp Leu Ser Arg Glu Asp His Leu Met Ala Leu Arg Tyr  
180 185 190

Ala Ala Asp Arg Cys Ala Val Pro Leu Trp Thr Ala Asp Val Leu Asp  
195 200 205

Gly Leu Ala Asp Ala Ala Gly Arg Pro Asp Gln Ser Ser Thr Gln Arg  
210 215 220

<210> 55

<211> 675

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 55

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gcgctgccct ggcgtccgca cccggaccgg gccgcccgtgc tgggtgcacga cctgcaacgc 120

tacttctctgc gcccgttcga ggccggggag tccccgatgg ccgaactgct ccccaacgtc 180

gcgaagctgc tcgccacggc gcggggcgcc gccgtgccgg tgetgtacac cgcgacagccc 240

ggcggcatga gccggcagga ccgcgggttg ctgcacgacc tgtggggccc cgccatgagc 300

agcgccgagg acgaccgggg catcgtcgac gacgtcgccc cgcagccggg cgacacggtg 360

ctgaccaagt ggcgttacag cgcgttcttc cgcagcgacc tggaggagcg actgcgcggt 420

gcgggacggg accagctcgt ggtctgcggc gtgtacgcgc acatgggggtg cctgatcacc 480

gcctgcgacg cgttcagccg cgacatcgag gcgttctctgg tggcggacgc gctggccgac 540

ctatcgcgcg aggaccacct gatggcgctg cgctacgccg cggaccgctg cgcggtgccg 600

ttgtggacgg cgcatgtgct ggacgggctg gcggacgccg ccggggcgcc ggatcagagc 660

agcacccaac gatga 675

<210> 56

<211> 233.  
 <212> PRT  
 <213> Micromonospora sp. strain 046-EC011

<400> 56

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Met Ser Asp Arg Thr Arg Val Val Val Val Gly Gly Thr Ser Gly Ile
1           5           10           15

Gly Arg His Phe Ala Arg Phe Cys Ala Glu Arg Gly Asp Asp Val Val
          20           25           30

Ile Thr Gly Arg Ser Ala Ala Arg Thr Lys Thr Val Ala Asp Glu Ile
      35           40           45

Gly Gly Arg Thr Arg Gly Leu Ala Leu Asp Leu Ala Glu Pro Glu Thr
50           55           60

Ile Ala Asp Ala Leu Ala Asp Val Pro His Val Asp Arg Leu Val Val
65           70           75           80

Ala Ala Leu Asp Arg Asp Tyr Asn Thr Val Arg Ala Tyr Arg Pro Gly
          85           90           95

Asp Ala Ala Arg Leu Leu Thr Val Lys Leu Val Gly Tyr Thr Ala Val
          100          105          110

Leu His Ala Leu Ala Pro Arg Met Thr Asp Glu Ser Ala Val Val Leu
      115           120           125

Leu Gly Gly Leu Ala Ser His Arg Pro Tyr Pro Gly Ser Thr Ser Val
130           135           140

Thr Thr Ala Asn Gly Gly Ile Ser Ala Leu Val Arg Thr Leu Ala Val
145           150           155           160

Glu Leu Ser Pro Val Arg Val Asn Ala Leu His Pro Ser Ile Val Ser
          165          170          175

Asp Thr Pro Phe Trp Ser Asp Lys Pro Ala Ala Arg Glu Ala Ala Ala
          180          185          190

Thr Arg Ala Leu Ser Arg Arg Pro Val Thr Met Gln Asp Cys Ala Glu
          195          200          205

Ala Ile Asp Phe Leu Leu Thr Asn Arg Ser Ile Asn Gly Val Asn Leu
210           215           220

Asn Ile Asp Gly Gly Asp Val Leu Ile
225           230

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<210> 57  
 <211> 702  
 <212> DNA  
 <213> Micromonospora sp. strain 046-EC011

<400> 57

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 gcccgattct gcgccgaacg cggagacgac gtggtgatca ccggccgttc ggcgccccgg 120  
 accaagaccg tggcggaacg gatcggcggg cggaccctg ggctcgtctt cgacctggcc 180  
 gagccggaga cgatcgcgga cgcgtcgcc gacgtgccgc acgtcgaccg gctcgtggtc 240  
 gcggcgctgg acccgacta caacaccgtc cgcgcgtacc ggccgggcca cgcggcgcg 300  
 ctgctgaccg tcaagctggc cggctacacg gcggtcctgc acgccctcgc cccgcggatg 360  
 accgacgaga gcgcagtcgt gctgctcggc ggcttgcca gccaccggcc gtatccccggc 420  
 tccacctccg tcacgaccgc caacggcggg atcagcgcgc tggcgcgga cctggctgtg 480  
 gaactctcgc cgggtccgggt caacgccctg caccgagca tcgtctccga caccgcgttc 540  
 tggagcgaca agcccgccgc gcgggaggcc gccgcgacc gcgcgctcag ccgacggccg 600  
 gtcacatgc aggactgcgc cgaggcgatc gacttcctgc tgacgaaccg ctcgataaac 660  
 ggggtcaacc tgaacatcga cggcggggac gtgctcatct ga 702

<210> 58

<211> 246

<212> PRT

<213> Micromonospora sp. strain 046-EC011

<400> 58

Met Thr Ser Ala Leu Arg Thr Ser Ala Trp Thr Tyr Asp Asp Phe Thr  
1 5 10 15

Ser Arg Glu Leu Asp Pro Ala Arg Trp Ala Ile Met Ser Ile Ala Gly  
20 25 30

Ala Asp Gly Gln Thr His Arg Tyr Gln Asp Arg Asn Ala Gln Val Arg  
35 40 45

Thr Gly Asp Gly Arg Leu Glu Leu Thr Val Asp Pro Phe Thr Arg Phe  
50 55 60

His Asp Thr Asp Pro Arg Gln Asn Asn Ala Lys Gln Met Tyr Arg Ser  
65 70 75 80

Val Arg Arg Phe Ala Val Pro Ala Glu Gly Ser Leu Thr Val Glu Val  
85 90 95

Glu Met Gly Val Arg Thr Tyr Arg Gln Ile Pro His Asp Leu Leu Asp  
100 105 110

Ala Phe Gly Thr Val Asn Leu Phe Asp Leu Glu Thr Gly Val Val Phe  
115 120 125

Asn Ala Ala Ala Thr Asn Asp Thr Val Tyr Ala Thr Val Glu Arg Leu

130

135

140

Val Leu Pro Gly Val Thr Gln Pro His Glu His Tyr Ile His Arg Val  
145 150 155 160

Val Leu Asp Val Pro Thr Glu Pro Gly Arg Ala His Gly Tyr Ala Ile  
165 170 175

Thr Tyr Arg Ala Pro Thr Ser Glu Val Glu Phe His Val Asp Gly Arg  
180 185 190

Leu Ala Tyr Trp Ala Arg Val Pro Val Pro Val Thr Gly Phe His Ala  
195 200 205

Gly Met Ala Leu Phe Ser Ala Arg Asp Leu Ala Arg Tyr Pro Arg Glu  
210 215 220

Gln Arg Glu His Gly Gln Gly Ala Thr Gly Trp Trp Gly Pro Trp Arg  
225 230 235 240

Ile Ala Ser Gly Val Arg  
245

<210> 59

<211> 741

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 59

atgacgtcgg cactgagaac cagcgcgtgg acgtacgacg acttcaccag ccgcgagctg 60  
gaccccgccc gctgggcgat catgtcgatc gccggcgcgg acgggcagac ccacaggtac 120  
caggaccgca acgcccaggt ccgcaccggc gacgggcggc tggagctgac cgtcgacccg 180  
ttcaccgct tccacgacac cgatccccgg cagaacaacg ccaagcagat gtaccggctg 240  
gtgcggcgct tcgccgtgcc ggccgagggc tcgctgaccg tcgaggtgga gatgggctg 300  
cggacgtacc ggcagatccc gcacgacctg ctggacgcgt tcggcacggt gaacctgttc 360  
gacctggaga ccggcgctcg gttcaacgcc gccgccacga acgacaccgt gtacgcgacg 420  
gtcgagcgcc tgggtgtgcc cggcgtgacc cagccgcaag agcactacat ccaccgggtg 480  
gtcctggacg tgccgacgga gccgggcccgg gcgcacggat acgccatcac ctaccgggcg 540  
ccgacgtcgg aggtggagtt ccacgtcgac ggccggctcg cctactgggc gcgggtcccc 600  
gtgccggtga ccggattcca cgccggcatg gcgctcttct ccgccgcga cctggccccg 660  
tacccccgag agcagcgagg gcacgggcag ggcgcgaccg ggtggtgggg gccgtggcgg 720  
atcgctccg gcgtcagatg a 741

<210> 60

<211> 111  
 <212> PRT  
 <213> Micromonospora sp. strain 046-EC011

<400> 60

Met	Asp	Thr	Ala	Ala	Pro	Ala	Thr	Asp	Gly	Gly	Arg	Tyr	Leu	Ala	Val
1				5					10					15	
His	His	Ser	Ala	Glu	Phe	Arg	Glu	Leu	Arg	Arg	Arg	Ser	Ser	Thr	Phe
			20					25					30		
Thr	Leu	Trp	Ala	Ser	Val	Ala	Phe	Phe	Gly	Trp	Trp	Phe	Leu	Gly	Ser
		35					40					45			
Leu	Leu	Ala	Thr	Tyr	Ala	Pro	Asp	Phe	Phe	Arg	Glu	Lys	Val	Ala	Gly
	50					55					60				
Pro	Val	Asn	Val	Gly	Leu	Leu	Phe	Val	Phe	Leu	Ser	Phe	Ala	Phe	Val
65					70					75				80	
Val	Thr	Leu	Ala	Ala	Phe	Tyr	Leu	Arg	Tyr	Ala	Arg	Thr	His	Leu	Asp
			85					90					95		
Pro	Leu	Ser	Glu	Lys	Ile	Arg	Ala	Asp	Leu	Glu	Gly	Ala	Ser	Arg	
			100					105					110		

<210> 61  
 <211> 336  
 <212> DNA  
 <213> Micromonospora sp. strain 046-EC011

<400> 61

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gagttcaggg	aactacggcg	acgatcgagc	acgttcacgc	tctgggccag	cgtcgccttc	120
ttcggctggt	ggttcctcgg	cagcctgctc	gccacctacg	cgccggactt	cttcggggag	180
aaggtggccg	gcccgggtcaa	cgtgggtctg	ctcttcgtct	tctgtcgtt	cgccttcgtg	240
gtgacgctcg	ccgccttcta	cctgcgttac	gcccgcacgc	atctcgatcc	gctcagcgag	300
aagatccgtg	ccgacctgga	aggagcgtcc	cgatga			336

<210> 62  
 <211> 559  
 <212> PRT  
 <213> Micromonospora sp. strain 046-EC011

<400> 62

Met	Ser	Val	Ile	Leu	Ala	Asp	Pro	Pro	Pro	Pro	Val	Asp	Asn	Thr	Trp
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Ala	Thr	Pro	Ala	Ile	Ala	Val	Pro	Val	Thr	Ile	Val	Leu	Ala	Leu	Ala

20					25					30									
Val	Leu	Tyr	Leu	Val	Arg	Ser	Ala	Arg	Ala	Ser	Thr	Thr	Thr	Ala	Asp				
35					40					45									
Gly	Phe	Leu	Leu	Ala	Asp	Arg	Arg	Ile	Gly	Pro	Val	Gln	Asn	Ala	Leu				
50					55					60									
Ala	Val	Ala	Ser	Ala	Pro	Leu	Met	Tyr	Ser	Thr	Met	Tyr	Ile	Ile	Thr				
65					70					75					80				
Gly	His	Ile	Ala	Leu	Ser	Gly	Tyr	Asp	Ala	Ile	Leu	Leu	Met	Thr	Ala				
85					90					95									
Phe	Thr	Met	Gly	Thr	Met	Leu	Ala	Leu	Phe	Leu	Phe	Ala	Gly	Pro	Val				
100					105					110									
Arg	Asn	Val	Gly	Gly	Tyr	Thr	Leu	Gly	Asp	Leu	Leu	Ala	Val	Arg	Thr				
115					120					125									
Arg	Glu	Arg	Pro	Ala	Arg	Ile	Ala	Ser	Ala	Val	Leu	Thr	Leu	Leu	Thr				
130					135					140									
Tyr	Val	Met	Leu	Thr	Val	Ile	Met	Met	Ala	Ala	Ile	Ala	Phe	Ile	Phe				
145					150					155					160				
Asn	Arg	Trp	Phe	Gly	Val	Asp	Ala	Leu	Val	Gly	Leu	Val	Leu	Pro	Val				
165					170					175									
Phe	Val	Val	Gly	Leu	Ile	Thr	Val	Gly	Tyr	Val	Tyr	Leu	Gly	Gly	Met				
180					185					190									
Leu	Gly	Val	Thr	Arg	Ile	Leu	Val	Phe	Lys	Leu	Val	Leu	Ser	Val	Val				
195					200					205									
Val	Val	Gly	Val	Leu	Thr	Ala	Trp	Val	Leu	Ala	Arg	Phe	Asp	Leu	Asn				
210					215					220									
Leu	Phe	Ser	Leu	Leu	Glu	Arg	Ala	Glu	Ala	Asn	Ala	Ala	Pro	Val	Pro				
225					230					235					240				
Ser	Gly	Ser	Asp	Leu	Leu	Gly	Pro	Gly	Arg	Leu	Phe	Gly	Glu	Gly	Ala				
245					250					255									
Thr	Thr	Leu	Val	His	Leu	Ser	Lys	Leu	Phe	Ala	Ile	Ala	Val	Gly	Val				
260					265					270									
Ala	Ala	Ile	Pro	Phe	Leu	Phe	Met	Arg	Asn	Phe	Ala	Val	Thr	Ser	Gly				
275					280					285									
Arg	Asp	Ala	Arg	Arg	Ser	Thr	Gly	Trp	Ala	Ser	Met	Ile	Ile	Val	Gly				
290					295					300									
Phe	Tyr	Leu	Cys	Leu	Ser	Val	Val	Gly	Leu	Gly	Ala	Val	Ala	Ile	Leu				
305					310					315					320				
Gly	Arg	Asp	Asn	Ile	Gly	Val	Ile	Lys	Ala	His	Arg	Asp	Ile	Ser	Phe				



325	330	335
Pro Lys Leu Ala Asp Glu Leu Gly Gly	Pro Val Met Val Gly Ser Leu	
340	345	350
Ala Gly Val Ala Val Leu Thr Ile Val Gly Val Phe Ala Pro Leu Leu		
355	360	365
His Ser Ala Val Thr Thr Val Thr Lys Asp Leu Asn Val Ile Arg Gly		
370	375	380
Arg Arg Leu Asp Pro Ala Ala Glu Leu Arg Asp Ile Lys Arg Asn Thr		
385	390	395
Leu Ile Ile Gly Val Gly Ser Val Leu Leu Ala Val Val Met Leu Pro		
405	410	415
Val Arg Thr His Ile Phe Ile Pro Thr Ser Ile Asp Ile Ala Gly Ala		
420	425	430
Val Val Leu Pro Ile Val Val Tyr Ala Leu Phe Trp Arg Arg Phe Asn		
435	440	445
Thr Arg Gly Leu Gln Trp Thr Val Tyr Gly Gly Leu Ala Leu Thr Ala		
450	455	460
Phe Leu Val Leu Phe Ser Asn Gly Val Ser Gly Glu Pro Asp Ala Ile		
465	470	475
Phe Pro Asp Arg Asn Phe Lys Phe Val Asp Val Glu Pro Ala Leu Ile		
485	490	495
Thr Val Pro Val Gly Phe Leu Leu Gly Tyr Leu Gly Ser Ile Thr Ser		
500	505	510
Arg Glu Arg Asp Asp Ala Ala Phe Ala Glu Met Gln Val Arg Ser Leu		
515	520	525
Thr Gly Ala Val Val Thr Gly Pro Pro Arg Pro Ala Ala Val Asp Asp		
530	535	540
Glu Asp Arg Asp Gly Arg Gln Asp Arg Ala Pro Ser Pro Val Ser		
545	550	555

<210> 63

<211> 1680

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 63

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cgcgccagca ccaccaccgc ggacggcttc ctgctggccg accggcggat cgggcccgtg 180

cagaacgcgc tggcgggtggc ctccgcgccg ctgatgtact cgacgatgta catcatcacc 240

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<210> 64

<211> 5960

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 64

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<210> 65  
<211> 532  
<212> PRT  
<213> Micromonospora sp. strain 046-EC011

<400> 65

Val Asp Pro Val Pro Val Leu Val Val Gly Ala Gly Pro Val Gly Met  
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Val Thr Ala Leu Ala Leu Ala Arg His Gly Val Ala Cys Val Leu Val  
20 25 30

Asp Gln Gly Phe Glu Thr Ser Val His Pro Lys Leu Asp Tyr Val Asn  
35 40 45

Ala Arg Ser Met Glu Phe Leu Arg Gln Phe Gly Leu Ala Asp Asp Val  
50 55 60

Arg Ala Ala Gly Val Ala Pro Glu His Arg Ala Asp Val Ile Trp Ser  
65 70 75 80

Thr Gly Leu Ala Gly Glu Pro Ile Thr Arg Trp Gly Leu Pro Ser Val  
85 90 95

Thr Gln Glu Trp Arg Arg Ile Ala Glu His Asn Asp Gly Thr Gln Pro  
100 105 110

Ala Glu Pro Gly Gln Arg Ile Ser Gln Ile Asp Leu Glu Pro Val Leu  
 115 120 125  
 Arg Ala Arg Cys Arg Arg Glu Pro Leu Val Asp Leu Arg Leu Gly Val  
 130 135 140  
 Arg Phe Asp Ser Leu Thr Gln Asp Asp Ala Gly Val Thr Ser Val Leu  
 145 150 155 160  
 Ala Asp Asp Thr Gly Gly Glu Val Arg Val Arg Ser Glu Tyr Val Val  
 165 170 175  
 Gly Cys Asp Gly Ala Ser Ser Gln Val Arg Arg Ala Val Gly Ile Gly  
 180 185 190  
 Glu Glu Gly Phe Asp Val Pro Gly Leu Pro Gly Ala Phe Met Val His  
 195 200 205  
 Phe Thr Ser Arg Asp Leu Asp Ser Leu His Arg His Gly Arg Phe Trp  
 210 215 220  
 His Tyr Phe Ala Phe Arg Tyr Val Ile Ile Ala Gln Asp Glu Val Asp  
 225 230 235 240  
 Thr Trp Thr Ala His Val Asn Gly Val Asp Pro Asn Glu Phe Asp Glu  
 245 250 255  
 Pro Pro Ala Asp Pro Glu Ala Phe Leu Leu Asp Thr Ile Arg Thr Glu  
 260 265 270  
 Leu Arg Ile Asp Lys Val Leu Leu Thr Ser Arg Trp Arg Pro Gly Phe  
 275 280 285  
 Met Leu Ala Asp Arg Tyr Arg Ala Gly Arg Val Leu Leu Ala Gly Asp  
 290 295 300  
 Ser Ala His Arg Met Phe Pro Thr Gly Ala Tyr Gly Met Asn Thr Gly  
 305 310 315 320  
 Ile Gly Asp Ala Val Asp Val Ala Trp Lys Leu Ala Ala Val Val Arg  
 325 330 335  
 Gly Phe Gly Gly Pro Gly Leu Leu Asp Ser Tyr Asp Ala Glu Arg Arg  
 340 345 350  
 Pro Val Gly Arg Arg Asn Met Arg Thr Ser His Arg His Leu Gly Val  
 355 360 365  
 His Leu Arg Ala Gly Glu Leu Leu Arg Gly Gly Ala Pro Leu Pro Ser  
 370 375 380  
 Val Ala Ala Phe Leu Asp Ala Glu Arg Gly Glu Asn Glu Tyr Arg Gly  
 385 390 395 400  
 Ile Glu Leu Gly Tyr Arg Tyr Ser Gly Ser Pro Val Leu Trp Pro Glu  
 405 410 415

Gly Pro Gly Glu Pro Ser Asp Asp Pro Arg Ala Tyr Ala Pro Thr Thr  
420 425 430

Trp Pro Gly Ala Arg Pro Pro Ser Leu Leu Leu Ser Asp Gly Gln Gln  
435 440 445

Ile Phe Asp Arg Phe Asp Pro Ala Ser Phe Thr Leu Val Asp Phe Thr  
450 455 460

Gly Asp Gly Ala Ala Gly Pro Leu Leu Ala Ala Ala Ala Ala Arg Gly  
465 470 475 480

Leu Pro Val Thr His Thr Val Val Thr Asp Pro Arg Ala Arg Glu Leu  
485 490 495

Trp Glu Arg Asp Leu Val Leu Leu Arg Pro Asp His His Val Ala Trp  
500 505 510

Arg Gly Asn Thr Val Pro Pro Asp Pro Asp Ala Val Val Gln Arg Val  
515 520 525

Arg Gly Gly Gly  
530

<210> 66

<211> 1599

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 66

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<210> 67  
 <211> 423  
 <212> PRT  
 <213> Micromonospora sp. strain 046-EC011

<400> 67

Met Gln Gln Ser Gly Ser Thr Ala Glu Arg Ser Pro Leu Gly Pro Trp  
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Glu Gly Met Pro Ala Val Gln Gln Pro Asp Trp Gln Asp His Pro Ala  
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Tyr Ala Glu Thr Cys Gln Ala Leu Ala Ser Ala Pro Pro Leu Val Pro  
 35 40 45

Pro Gly Glu Val Arg Gly Phe Arg Gln Leu Leu Ser Glu Leu Ala Ser  
 50 55 60

Thr Asp Gly Leu Leu Leu Gln Leu Gly Asp Cys Ala Glu Ser Leu Tyr  
 65 70 75 80

Glu Cys Thr Pro Arg His Thr Ser Asp Lys Ile Glu Val Ile Asp Arg  
 85 90 95

Leu Gly Asp Arg Leu Ser Glu Leu Thr Gly Arg Asn Val Leu Arg Val  
 100 105 110

Gly Arg Met Ala Gly Gln Phe Ala Lys Pro Arg Ser Gln Ala Thr Glu

115	120	125
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Ser Glu Leu Ala Ala Pro Gly Thr Arg Lys Ala Asp Pro Arg Arg Met 145 150 155 160		
Trp Trp Ala Tyr Glu Ala Ser Asp Arg Val Gln Arg Val Leu Arg Ala 165 170 175		
His Arg Glu Gly Asn Arg Arg Ala Ala Arg Thr Glu Gly Pro Trp Ser 180 185 190		
Ser His Glu Ala Leu Val Val Asp Tyr Glu Ser Arg Leu Ile Arg Arg 195 200 205		
Asp Pro Asp Thr Gly Glu His Tyr Leu Ala Ser Thr His Leu Pro Trp 210 215 220		
Val Gly Glu Arg Thr Arg Arg Ser Ala Glu Ala His Val Ala Met Leu 225 230 235 240		
Ser Thr Val Val Asn Pro Val Gly Cys Lys Ile Gly Pro Asp Ala Asp 245 250 255		
Pro Asp Asp Val Leu Arg Val Cys Glu Ala Leu Asp Pro Arg Arg Asp 260 265 270		
Pro Gly Arg Leu Val Leu Ile Pro Arg Met Gly Arg Asp Arg Ile Arg 275 280 285		
Glu Ser Leu Pro Pro Ile Val Arg Ala Val Val Asn Ala Gly His Pro 290 295 300		
Val Leu Trp Leu Ser Asp Pro Met His Gly Asn Thr Val Lys Ala Ser 305 310 315 320		
Val Gly Leu Lys Thr Arg His Leu Ser Asp Val Val Thr Glu Ala Leu 325 330 335		
Trp Phe Arg Asp Ile Leu Asp Gln Gln Arg Gln His Ala Ala Gly Leu 340 345 350		
His Ile Glu Val Ala Ala Thr Asp Val Thr Glu Cys Val Gly Gly Ser 355 360 365		
Val Ala Gly Glu Glu Asp Leu Ala Arg His Tyr Thr Ser Leu Cys Asp 370 375 380		
Pro Arg Leu Asn Pro Gly Gln Ala Thr Glu Leu Ile Glu Ala Trp Ala 385 390 395 400		
Lys Asp Thr Ala Thr Val Gly Pro Gly Pro Arg Arg Ser Gly Pro Ser 405 410 415		
Ala Arg Pro Glu Val Ala Ala		

420

<210> 68  
 <211> 1272  
 <212> DNA  
 <213> Micromonospora sp. strain 046-EC011

<400> 68  
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 gcggtccagc aaccggactg gcaggaccac ccggcgtagc cggagacctg tcaggcggtg 120  
 gcgtcggccc cgccgctggt cccaccgggg gaggtacggg ggttccggca gctgttgctg 180  
 gagctggcgt cgaccgacgg gtcctctgct cagttggggc actgcgccga gagcctctac 240  
 gagtgcaccc cccggcacac ctccgacaag atcgaggtca tcgaccggct gggggaccgg 300  
 ctccgagcgc tcaccgggcg caacgtgctg cgggtggggc ggatggccgg gcagttcgcc 360  
 aagccccggt cgcaggcgac ggagtggcac gacgcgctga gcatcccctc ctcccgcggc 420  
 cacatgatca attccgagct ggccgcgccc ggtacgcgca aggccgacct tcgccgcatg 480  
 tggtagggcgt acgaggcgag cgaccgggtg cagcgggtcc tgcgcgccca ccgggagggc 540  
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 ctgcgggtgt gcgaggcgct cgaccgcggc cgcgatcccg gccgtctcgt cctgatcccg 840  
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 gcggggcacc ccgtgctctg gctgagcgat cccatgcacg gcaacaccgt caaggcctcg 960  
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 aaggacaccg cgacggctcg cccgggaccg cggcgctccg gcccttcggc gcggccggag 1260  
 gtcgccgcct ga 1272

<210> 69  
 <211> 340  
 <212> PRT  
 <213> Micromonospora sp. strain 046-EC011

<400> 69

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Phe	Pro	Leu	Pro	Asp	Ala	Ala	Thr	Glu	Asp	Arg	Ser	Val	Leu	Gly	Glu	20	25	30	
Thr	Val	Pro	Val	Ser	Ala	Leu	Leu	Pro	Gly	Asp	Ser	Pro	Arg	Leu	Ala	35	40	45	
Gly	Glu	Asn	Val	Glu	His	Ile	Arg	Leu	Leu	Ala	Ala	Met	His	Asp	Leu	50	55	60	
Pro	Pro	Ile	Leu	Val	Gln	Arg	Gly	Thr	Met	Arg	Val	Ile	Asp	Gly	Met	65	70	75	80
His	Arg	Leu	Arg	Ala	Ala	Lys	Leu	Arg	Gly	Asp	Glu	Thr	Val	Arg	Val	85	90	95	
Thr	Phe	Phe	Asp	Gly	Asp	Asp	Ala	Ala	Ala	Phe	Leu	Leu	Ser	Val	Asp	100	105	110	
Ala	Asn	Ile	Lys	His	Gly	Leu	Pro	Leu	Ser	Arg	Ala	Asp	Arg	Glu	Ala	115	120	125	
Ala	Ala	Thr	Arg	Ile	Leu	Arg	Leu	Tyr	Pro	Gln	Trp	Ser	Asp	Arg	Ala	130	135	140	
Val	Ala	Ala	Ala	Ala	Gly	Leu	Ser	Pro	Thr	Thr	Ala	Ser	Gly	Ile	Arg	145	150	155	160
Arg	Arg	Leu	Leu	Gln	Pro	Ala	Ala	Arg	Glu	Gly	Ser	Arg	Val	Gly	Arg	165	170	175	
Asp	Gly	Arg	Val	Arg	Pro	Leu	Asp	Gly	Ser	Ala	Gly	Arg	Arg	Arg	Ala	180	185	190	
Ser	Ala	Val	Ile	Ala	Leu	Arg	Pro	Asp	Ala	Pro	Leu	Arg	Ala	Ile	Ala	195	200	205	
Gln	Glu	Ala	Gly	Val	Ser	Val	Gly	Thr	Ala	Arg	Asp	Val	Arg	Ala	Arg	210	215	220	
Leu	Gln	Ala	Gly	Arg	Asp	Pro	Val	Leu	Thr	Ser	Gln	Arg	Pro	Ala	Ala	225	230	235	240
Glu	Pro	Glu	Pro	Ala	Ala	Asp	Asp	Gly	Pro	Glu	Ala	Arg	Arg	Arg	Arg	245	250	255	
Leu	Gly	Gln	Pro	Ser	Val	Pro	Pro	Val	Asp	Trp	Pro	Ala	Val	Arg	Gly	260	265	270	
Asn	Leu	Ile	Arg	Asp	Pro	Ala	Val	Lys	Tyr	Ala	Glu	Leu	Gly	Arg	Ala	275	280	285	

Phe Val Arg Trp Ala Asp Gly His Val Val Asp Pro Ala Ala Trp Arg  
 290 295 300

Glu Phe Val Asp Ala Val Pro Pro Tyr Trp Arg Lys Ser Val Ala Glu  
 305 310 315 320

Leu Ala Arg Ser Cys Ala Ser Ala Trp Leu Ala Phe Ala Gln Glu Leu  
 325 330 335

Glu Asp Arg Ala  
 340

<210> 70  
 <211> 1023  
 <212> DNA  
 <213> Micromonospora sp. strain 046-EC011

<400> 70  
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 cccggtgact ccccgcggtt ggcgggagag aacgtcgagc acatccggct gctggccgcg 180  
 atgcacgacc tcccgcgat cctggtgcaa cgcggcacga tgcgggtgat cgacggcatg 240  
 caccggctgc gggccgcaa gctgcgcggc gacgagaccg tgcgggtgac gttcttcgac 300  
 ggggacgacg ccgcggtgtt cctgctctcg gtcgagcca acatcaaaca cgggctgccg 360  
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 tcggaccgcg ccgtcgccgc ggcggccggg ctgtcaccga ccacggcgag cggcatccgg 480  
 cgccgcctgc tgcaaccggc ggcgcgggag ggcagccggg tgggacggga cgggcgggtg 540  
 cgcccgtgg acggctcggc gggccgacgg cgggccagcg cggtcacgc gctccggccg 600  
 gacgcgcccc tgcgtgccat cgcgcaggag gccggggtgt cgggtgggcac ggcgcgggac 660  
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 aagtacgccc agctgggccc ggccttcgtc cgctgggccc acgggcacgt ggtggatccg 900  
 gggcctggc gcgagttcgt cgacgccgtg ccgccgtact ggcgcaaata ggtggccgag 960  
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 tga 1023

<210> 71  
 <211> 493

<212> PRT

<213> Micromonospora sp. strain 046-ECO11

<400> 71

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Ala Ala Ala Pro Gln Ala Pro Thr Phe Asp Leu Asp Asn Gly Asn Ala  
35 40 45  
Leu Thr Asp Val Ile Tyr Pro Ala Leu Asn Thr Glu Pro Arg Val Glu  
50 55 60  
Tyr Ser Gly Arg Pro Gly Ser Trp Ala Ala Asp Arg Ala Met Leu Ile  
65 70 75 80  
Glu Leu Pro Trp Phe Asp Ala Leu Ala Ala Tyr His Pro Thr Ala Val  
85 90 95  
Gly Ile Phe Ser Thr Ile Gly Arg Arg Pro Ala Glu Glu His Thr Thr  
100 105 110  
Arg Asn Lys Asn Ile Ala Val Ile Tyr Ser Ala Tyr Thr Ser Leu Ser  
115 120 125  
Lys Leu Tyr Pro Gln His Glu Ala Thr Trp Gln Arg Met Met Ala Thr  
130 135 140  
Ala Gly Leu Asp Pro Ala Val Thr Ala Glu Asp Arg Thr Thr Ala Ser  
145 150 155 160  
Gly Ile Gly Ile Leu Ala Ser Lys Asn Ala Met Ala Ala Arg Arg Asn  
165 170 175  
Asp Gly Thr Asn Arg Asp Gly Asp Ala Gly Gly Arg Arg Tyr Asn Arg  
180 185 190  
Glu Pro Tyr Ala Asp His Thr Gly Tyr Arg Pro Val Asn Ser Pro Tyr  
195 200 205  
Glu Leu Arg Phe Pro Ser Arg Trp Gln Pro Asn Thr Ile Ser Lys Arg  
210 215 220  
Glu Val Val Leu Thr Gln Glu Phe Ala Thr Pro Gln Phe Gly Arg Val  
225 230 235 240  
Lys Pro Ile Thr Phe Glu Arg Pro Glu Gln Phe Arg Leu Thr Pro Pro  
245 250 255  
Pro Asn His His Leu Leu Asn Pro Lys Gly Tyr Arg Lys Gln Ala Asp  
260 265 270  
Glu Val Leu Arg Ala Ser Ala Gly Leu Asp Asp Arg Lys Lys Met Ser

275	280	285
Ala Glu Ile Phe Ser Asp Asn Ile Thr Pro Tyr Gly Ala Ile Ala His 290 295 300		
Thr Leu Leu Arg Gly Arg Tyr Asn Thr Glu Asp Ser Val Arg Phe Ile 305 310 315 320		
Val Met Thr Asp Val Ala Gly Phe Asp Val Ala Ile Ala Ser Trp Tyr 325 330 335		
Tyr Met Arg Lys Tyr Asp Ser Val Gln Pro Phe Ser Ala Ile Arg His 340 345 350		
Leu Tyr Pro Asn Lys Lys Leu Thr Ala Trp Gly Gly Pro Gly Arg Gly 355 360 365		
Thr Val Asn Asp Ile Thr Gly Thr Gln Trp Arg Ser Tyr Leu Ser Ser 370 375 380		
Val Ala Ile Ala Ala Pro Asp Tyr Pro Ser Val Asn Ala Ala Val Cys 385 390 395 400		
Val Ala Tyr Ala Gln Val Ala Arg Arg Phe Thr Gly Thr Asp Lys Leu 405 410 415		
Thr Val Val Ile Pro Val Arg Lys Gly Ser Ser Ile Val Glu Pro Gly 420 425 430		
Val Thr Pro Ala Ala Asp Met Met Leu Thr Trp Asn Ser Tyr Ser Glu 435 440 445		
Trp Ala Ala Glu Cys Gly Gln Ser Arg Val Trp Ala Gly Glu Asn Phe 450 455 460		
Pro Ala Ser Val Ala Ala Ala Asp Gln Tyr Ala Pro Gln Ile Gly Asp 465 470 475 480		
Arg Ala Phe Asp Phe Val Gln Ser Lys Leu Asn Gly Arg 485 490		

<210> 72

<211> 1482

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 72

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ttcgacctcg acaacgggaa cgccctgacc gacgtcatct acccggccct caacaccgag	180
ccgcgggtcg agtacagcgg ccggcccggg tcttggggcg cggaccgcgc catgctcatc	240
gaactgccgt ggttcgacgc cctggcggcg taccacccca ccgcggtcgg catcttctcc	300

accatcggcc gccgtcccgc cgaggagcac acgacgcgca acaagaacat cgccgtcatc	360
tactcggcct acacctcgct cagcaagctc tccccccagc acgaggcgac ctggcagcgg	420
atgatggcca ccgcgggcct ggacccggcc gtcaccgcgg aggaccggac caccgccagc	480
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<210> 73

<211> 9762

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 73

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tccgcggtct gaccgcgagc gagggcagcc tgtatccgct gctcgcccg atcgggcagg	240
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<210> 74  
<211> 112  
<212> PRT  
<213> Micromonospora sp. strain 046-EC011

<400> 74

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Leu	Glu	Tyr	Cys	Val	Leu	Ala	Leu	Leu	Ser	Arg	Arg	Asp	Met	Tyr	Gly
			20					25					30		
Leu	Glu	Leu	Ala	Asp	Trp	Leu	Ala	Val	Arg	Gly	Leu	Thr	Ala	Ser	Glu
			35					40					45		
Gly	Ser	Leu	Tyr	Pro	Leu	Leu	Ala	Arg	Met	Arg	Gln	Ala	Gly	Ser	Val
			50					55					60		
Gln	Thr	Arg	Trp	Val	Ala	Pro	Glu	Gln	Gly	His	Ala	Arg	Arg	Tyr	Tyr
Ala	Ile	Thr	Asp	Gln	Gly	Arg	Ala	His	Leu	Arg	Val	Phe	Ala	Ala	Val

Trp Gln Glu Ile Gln Pro His Val Asp Asp Leu Met Gly Glu Glu Ala  
 100 105 110

<210> 75  
 <211> 339  
 <212> DNA  
 <213> Micromonospora sp. strain 046-EC011

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 gtcgcgggtc tgaccgagcg cgagggcagc ctgtatccgc tgctcgcccg catgcggcag 180  
 gccggctccg tgcagaccgg gtgggtggcc cccgagcagg ggcacgcccg gcggtactac 240  
 gcgatcaccg accaggggcg ggcgcacctg cgggtgttcg cggcgggtgtg gcaggagatc 300  
 cagccgcacg tggacgacct gatgggggag gaagcatga 339

<210> 76  
 <211> 325  
 <212> PRT  
 <213> Micromonospora sp. strain 046-EC011

<400> 76

Met Ser Asp Asp Gly Leu Pro Glu Ala Ala Trp Thr Tyr Leu Arg Ala  
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Leu Asp Ala Glu Leu Ser Asp Val Pro Ser Gly Thr Ala Glu Glu Ile  
 20 25 30

Val Ala Asp Val Arg Ala His Ile Ala Asp Ala Leu Asp Ser Gly Arg  
 35 40 45

Ser Ala His Glu Ile Leu Ala Gly Leu Gly Ala Ala Arg Asp Val Ala  
 50 55 60

Arg Gln Ala Arg Glu Glu Leu Gly Leu Pro Ala Gln Asp Arg Pro Ala  
 65 70 75 80

Arg Ala Gly Arg Thr Leu Ser Leu Ala Ala Val Ala Val Gly Val Leu  
 85 90 95

Ile Ala Val Cys Val Ser Phe Leu Leu Pro Ser Ala Val Pro Val Glu  
 100 105 110

Pro Ile Gln Ala Gly Pro Gly Glu Gln Gly Val Leu Arg Arg Leu Gly  
 115 120 125

Pro Gly Ile Ala Leu Leu Thr Leu Leu Pro Ala Leu Val Ala Ala Ala  
 130 135 140

Pro Leu Val Ala Pro Ala Arg Ala Arg Ala Gly Val Arg Phe Ala Gly

145	150	155	160
Ala Ala Val Leu Thr Met Phe Ala Cys Ala Ala Gly Glu Thr Gly Leu	165	170	175
Tyr Tyr Phe Pro Leu Ala Leu Met Ala Trp Ala Ala Ala Ile Val Pro	180	185	190
Trp Ala Leu Arg Arg Gly Ala Gly Gly Arg Trp Trp Arg Tyr Leu Thr	195	200	205
Gly Gly Phe Val Ala Met Pro Gly Val Leu Val Ala Val Ala Ser Ala	210	215	220
Gly Gly Ser Val Gly Val Gly Trp Val Gly Ala Ala Leu Trp Ile Ala	225	230	235
Gly Pro Leu Ala Ala Gly Ala Leu Cys Ala Tyr Gly Ile Arg Ala Gly	245	250	255
Tyr Ala Val Thr Ala Leu Ala Gly Ala Leu Ala Ile Ala Leu Ser Met	260	265	270
Ala Glu Arg Gly Phe Leu Phe Ala Ala Phe Trp Leu Phe Gly Gly Leu	275	280	285
Tyr Leu Ala Leu Gly Ala Ala Ala Tyr Thr Ala Ser Arg Ala Val Asp	290	295	300
Gly Asp Ala Ala Ala Thr Pro Gly Pro Pro Ala Arg Pro Glu Pro Ala	305	310	315
Pro Ala Pro Gly Gly	325		

<210> 77

<211> 978

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 77

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gccgacgccc tcgacagcgg acggagcgcc cagagatcc tcgccggcct cggcgccgcg	180
cgggacgtgg cccggcaggc gcgcgaggag ctggggctgc cggcccagga cggcccggcc	240
cgggccggcc ggaccctgtc cctggccgcg gtggcggtcg gcgtgctgat cgccgtgtgc	300
gtgagcttcc tgctgccgtc cgcagtgccg gtggagccga tccaggccgg ccccggcgag	360
cagggcgctc tccgccggct cggccccgga atcgcgctgc tcacgtgct gcccggcgtc	420
gtcgcggccg cgccgctcgt ggcgcccgcc cgggcacgtg ccgggggtacg gttegcggcg	480



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ggacggtggt ggcgctatct gaccggtgga ttcgtggcga tgcccggcgt gctggtggcg 660  
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<210> 78  
<211> 663  
<212> PRT  
<213> Micromonospora sp. strain 046-EC011

<400> 78

Met Leu Asp His Ala Ser Gly Arg Ile Asp Val Thr Arg Leu Arg Glu  
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Ala Leu Asp Gly Arg Trp Ala Glu Val Arg Arg Ala His Arg Glu His  
20 25 30

Leu Asp Glu Arg Phe Leu Pro Val Tyr Gly Glu Thr Gly Asp Gln Ala  
35 40 45

Arg Glu Arg Ile Thr Arg Leu Leu Ser Glu Leu Pro Val Glu Leu Gly  
50 55 60

Ile Ala Ser Gly Phe Pro Ala Glu Tyr Gly Gly Arg Gly Asp Val Gly  
65 70 75 80

Ala Ser Ile Val Ala Thr Glu Met Leu Ala Gln Val Asp Leu Ser Leu  
85 90 95

Met Val Lys Ala Gly Val Gln Trp Gly Leu Phe Gly Gly Ala Val Ala  
100 105 110

Ala Leu Gly Thr Lys Arg His His Asp Ala Tyr Leu Arg Asp Ile Val  
115 120 125

Ala Gly Arg Leu Phe Gly Cys Phe Ala Met Thr Glu Thr Gly His Gly  
130 135 140

Ser Asp Val Gln Gln Leu Arg Thr Thr Cys Val Tyr Asp Pro Gln Thr  
145 150 155 160

Gln Thr Phe Asp Leu His Thr Pro His Glu Ala Ala Arg Lys Asp Tyr

165					170					175					
Ile	Gly	Asn	Ala	Ala	Arg	Asp	Gly	Arg	Met	Ala	Val	Val	Phe	Ala	Gln
180					185					190					
Leu	Val	Thr	Gly	Gly	Arg	Arg	His	Gly	Val	His	Ala	Trp	Leu	Val	Pro
195					200					205					
Ile	Arg	Asp	Glu	His	Gly	Lys	Pro	Met	Pro	Gly	Val	Thr	Ile	Gly	Asp
210					215					220					
Ala	Gly	Pro	Lys	Ala	Gly	Leu	Leu	Gly	Val	Asp	Asn	Gly	Arg	Leu	Ser
225					230					235					
Phe	Asp	His	Val	Arg	Val	Pro	Arg	Glu	Met	Leu	Leu	Asp	Gln	Tyr	Ala
245					250					255					
Gln	Val	Ala	Glu	Asp	Gly	Thr	Tyr	Ser	Ser	Pro	Ile	Glu	Asn	Asp	Ser
260					265					270					
Arg	Arg	Phe	Phe	Thr	Met	Leu	Gly	Thr	Leu	Val	Arg	Gly	Arg	Val	Ser
275					280					285					
Val	Gly	Gly	Ala	Ala	Ser	Ala	Ala	Thr	Lys	Ser	Ala	Leu	Ala	Ile	Ala
290					295					300					
Val	Arg	Tyr	Gly	Asp	Ile	Arg	Arg	Gln	Phe	Ala	Asp	Ala	Asp	Gly	Asp
305					310					315					
Arg	Glu	Val	Leu	Leu	Asn	Asp	Tyr	Leu	Ala	His	Gln	Arg	Lys	Leu	Leu
325					330					335					
Pro	Ala	Leu	Ala	Thr	Thr	Tyr	Ala	Leu	Thr	Phe	Ala	Gln	Ala	Glu	Leu
340					345					350					
Val	Ala	Ala	Leu	Asp	Asp	Ile	Gln	Gly	Gly	Asp	Gly	Pro	Val	Asp	Glu
355					360					365					
His	Arg	Gln	Arg	Glu	Leu	Glu	Ser	Arg	Ala	Ala	Gly	Leu	Lys	Ala	Ala
370					375					380					
Gln	Thr	Trp	His	Ala	Thr	Arg	Thr	Ile	Gln	Ile	Cys	Arg	Glu	Ala	Cys
385					390					395					
Gly	Gly	Ala	Gly	Tyr	Leu	Ser	Glu	Asn	Arg	Leu	Pro	Ser	Leu	Lys	Ala
405					410					415					
Asp	Thr	Asp	Val	Phe	Thr	Thr	Phe	Glu	Gly	Asp	Asn	Thr	Val	Leu	Leu
420					425					430					
Gln	Leu	Val	Ala	Lys	Gly	Leu	Leu	Thr	Gly	Tyr	Arg	Asp	Glu	Phe	Gly
435					440					445					
Ser	Leu	Asp	Gly	Trp	Gly	Arg	Ala	Ser	Phe	Val	Ala	Glu	Gln	Val	Arg
450					455					460					
Glu	Met	Val	Leu	Glu	Arg	Thr	Ala	Ala	Arg	Ala	Leu	Ile	Ala	Arg	Leu

465		470		475		480
Val Ser Ala Val	Pro Gly Arg Asp Asp	Glu Val Ala Val	Thr Asp Arg			
	485		490		495	
Gly Trp Gln Leu Lys Leu Phe Glu Asp Arg Glu Glu His Leu Leu Asp						
	500		505		510	
Ser Ala Val Arg Arg Leu Arg Gly Gly Ala Ser Thr Lys Lys Asp Arg						
	515		520		525	
Pro Phe Asp Ile Phe Asn Asp Val Gln Asp His Val Leu Ala Val Ala						
	530		535		540	
Ala Ala His Ile Asp Arg Val Thr Leu Glu Ala Phe Val Ala Gly Ile						
	545		550		555	560
Asp Ala Ile Ala Asp Pro Ala Val Lys Glu Leu Leu Ser Arg Val Cys						
	565		570		575	
Asp Leu Tyr Ala Leu Thr Val Ile Glu Ala Asn Lys Gly Trp Leu Leu						
	580		585		590	
Glu His Gly Arg Leu Thr Pro Ala Arg Ser Lys Thr Ile Thr Ser Val						
	595		600		605	
Val Asn Gly Leu Leu Lys Glu Leu Arg Pro Asp Met Arg Thr Leu Val						
	610		615		620	
Asp Gly Phe Ala Ile Pro Asp Ala Trp Leu His Ala Ala Ile Leu Arg						
	625		630		635	640
Glu Glu Pro Val Arg Gln Glu Thr Met Ala Ala His Asp Ala Ala Gly						
	645		650		655	
Asp Pro Gln Ala Val Pro Ala						
	660					

<210> 79

<211> 1992

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 79

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cgcacgctcg tggacggctt cgccatcccg gacgcgtggc tgcacgcggc gatcctgcgc	1920
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gtccccgcct ag	1992

<211> 573  
 <212> PRT  
 <213> Micromonospora sp. strain 046-EC011

<400> 80

Val	Ser	Pro	Leu	Pro	Pro	Gly	Ser	Ala	Val	Thr	Ala	Arg	His	Val	Leu
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			20					25					30		
Leu	Leu	Gly	Leu	His	Gln	Val	Thr	Glu	Ala	Leu	Val	Pro	Val	Ala	Ile
		35					40					45			
Gly	Val	Ile	Ile	Asp	Arg	Ala	Val	Val	Thr	Gly	Asp	Pro	Trp	Ala	Leu
	50					55					60				
Ala	Tyr	Ser	Val	Ala	Gly	Leu	Ala	Ala	Leu	Phe	Thr	Val	Leu	Ala	Phe
65					70					75					80
Ala	Tyr	Arg	Asn	Gly	Ala	Arg	Gln	Ala	Phe	Ala	Ala	Val	Glu	Arg	Glu
			85						90					95	
Ala	His	Leu	Leu	Arg	Val	Glu	Leu	Ala	Glu	Arg	Ala	Leu	Asp	Pro	Arg
		100						105					110		
Gly	His	Arg	Ser	Gly	Leu	Arg	Asp	Gly	Glu	Leu	Leu	Ser	Val	Ala	Ala
		115					120					125			
Ser	Asp	Ala	Glu	Leu	Ser	Ala	Tyr	Val	Val	Arg	Val	Ala	Gly	Phe	Gly
	130					135					140				
Val	Ala	Ala	Val	Ser	Ala	Leu	Thr	Val	Ala	Ala	Val	Ala	Leu	Leu	Val
145					150					155					160
Ile	Asp	Val	Pro	Leu	Gly	Leu	Gly	Val	Leu	Ile	Gly	Val	Pro	Val	Leu
				165					170					175	
Val	Leu	Ala	Leu	Gln	Arg	Met	Ala	Pro	Leu	Leu	Ser	Arg	Arg	Ser	Ala
			180					185					190		
Ser	Gln	Gln	Glu	Ala	Leu	Ala	Glu	Thr	Thr	Ala	Leu	Ala	Val	Asp	Leu
		195					200					205			
Val	Ser	Gly	Leu	Arg	Val	Leu	Arg	Gly	Ile	Gly	Ala	Gln	His	His	Ala
	210					215					220				
Ala	Gly	Arg	Tyr	Ala	Glu	Ala	Ser	Arg	Arg	Ala	Leu	Ala	Val	Thr	Leu
225					230					235					240
Arg	Ala	Ala	Asn	Thr	Lys	Gly	Leu	His	Leu	Gly	Leu	Thr	Thr	Ala	Ala
			245						250					255	
Asn	Gly	Leu	Phe	Leu	Ala	Ala	Val	Ala	Gly	Val	Ala	Gly	Trp	Leu	Ala
			260					265					270		

Leu Arg Gly Arg Leu Thr Ile Gly Glu Leu Val Thr Val Val Gly Leu  
 275 280 285  
 Ala Gln Phe Val Ala Glu Pro Val Gln Thr Leu Gly Tyr Cys Val Gln  
 290 295 300  
 Leu Phe Ala Met Ala Arg Ala Ser Ala Ala Arg Val Gly Arg Val Leu  
 305 310 315 320  
 Gly Ala Glu Pro Leu Thr Arg Pro Gly Ser Ala Pro Arg Pro Asp Arg  
 325 330 335  
 Thr Asp Gly Pro Arg Leu Val Leu Asp His Val Gly His Ala Ala Leu  
 340 345 350  
 Asp Gly Val Cys Leu Arg Val Asp Pro Gly Glu Ile Val Gly Val Leu  
 355 360 365  
 Ala Tyr Asp Pro Ala Asp Ala Asp Ala Leu Val Ala Leu Leu Ser Gly  
 370 375 380  
 Arg Val Pro Ala Asp Arg Arg Arg Gly Thr Val Arg Val Asp Gly Val  
 385 390 395 400  
 Pro Ala Asp Asp Leu Asp Val Asp Ala Leu Arg Gly Ala Val Leu Val  
 405 410 415  
 Glu Pro His Asp Val Thr Leu Phe Glu Gly Thr Val Ala Ala Asn Leu  
 420 425 430  
 Ala Ala Gly Ser Arg Thr Glu Glu Gly Arg Leu Arg Ala Ala Val Arg  
 435 440 445  
 Ala Ala Ala Ala Asp Asp Val Val Asp Ala His Pro Gly Gly Leu Gly  
 450 455 460  
 His Arg Leu Val Glu Arg Gly Ala Asn Leu Ser Gly Gly Gln Arg Gln  
 465 470 475 480  
 Arg Leu Gly Leu Ala Arg Ala Leu His Ala Asp Pro Pro Val Leu Val  
 485 490 495  
 Leu His Asp Pro Thr Thr Ala Val Asp Ala Ala Thr Glu Ala Gln Leu  
 500 505 510  
 Ala Asp Gly Leu Ala Gly Ala Arg Arg Glu Ala Pro Arg Gly Thr Leu  
 515 520 525  
 Leu Val Thr Ser Ser Pro Ala Leu Leu Arg Ile Thr Asp Arg Val Val  
 530 535 540  
 Val Ile Ala Asp Gly Arg Val Thr Ala Glu Gly Thr His Glu His Leu  
 545 550 555 560  
 Leu Ala Thr Asp Ala Arg Tyr Arg Glu Glu Thr Leu Arg  
 565 570

<210> 81  
 <211> 1722  
 <212> DNA  
 <213> Micromonospora sp. strain 046-EC011

<400> 81  
 gtgtccccgc ttccccccgg cagcgccgctc accgcccggc acgtgctccg ccaggcgctg 60  
 cgccgccagc gccgcccggg gctgatcggc gtgaccctgc tcgggctgca ccaggtcacc 120  
 gaggcgctcg tgccgggtggc gatcggcgctc atcatcgacc gggccgtggt gaccggcgac 180  
 ccgtggggcg tcgcgtactc cgtcgccggc ctcgccgccc tgttcaccgt gctggcgctt 240  
 gcctaccgca acggcgcccc ccaggcgctt cggcggggtg aacgggaggg gcacctgctg 300  
 cgggtcgagc tggccgagcg cgcgctcgac ccgcgcgggc accgctccgg cctgcgcgac 360  
 ggcgagctgc tctcggtcgc cgctccgac gccgaactct ccgcgtacgt ggtccgggtg 420  
 gccggcttcg gcgtcgccgc ggtgagcgcg ctgaccgtcg cggcggtcgc gctgctggtc 480  
 atcgacgtcc cgctcggact cggcggtgctc atcggcgta cgggtgctggt cctggcgctg 540  
 caacggatgg cgccgctgct gtccccggcg agcgctccc agcaggaggg cctcgcgagg 600  
 accacggcgc tcgccgtgga cctcgtctcc ggctgcgcg tgctgcgcgg catcgggcgc 660  
 cagcaccacg ccgccggccg gtacgccgag gccagccgac gcgcctcgc cgtgacgctg 720  
 cgcgccgcca acaccaagg cctgcacctc gggctcacca ccgcccgaa cggcctcttc 780  
 ctgcgcccg tcgccggggg cgccgggtgg ctgcgctgc gcggccggct caccatcggc 840  
 gagctggtca ccgtggtcgg gctcgcgag ttctcgccg agccgggtgca gacgctgggc 900  
 tactgcgtgc agctgttcgc gatggcccg gcctccgcc cccgggtcgg gcgcgtgctc 960  
 ggcgccgagc cgctgacctg gccgggcagc gcgccccggc cggaccgcac ggacggggcg 1020  
 cggctcgttc tcgaccacgt cggccacgcc gcgctggacg ggggtgtgct gcgcgtcgac 1080  
 ccgggagaga tcgtcggcgt cctggcgta caccggccg acgcggacgc gctggtggcg 1140  
 ctgctgtccg ggcgggtgcc cgcggaccgg cgccggggca cggtagcgt cgacggggta 1200  
 cccgccgacg acctggacgt cgacgcgctg cgcggcgccg tctggtcga gccgcacgac 1260  
 gtgacgctgt tcgaggggaa cgtggccgcc aacctcgcc cggggagcag gaccgaggag 1320  
 gggcgccctg gcgcccggt ccgggcggcc gcggcgagc acgtggtgga cgcgcacccc 1380  
 ggcggcctcg gccaccggct cgtcgagcgg ggcgccaacc tctccggcg gcagcgccag 1440  
 cggctcgggc tggcgcgggc gctgcacgcc gaccgcggc tgctggtgct gcacgacccc 1500  
 accaccgccg tggacgcggc caccgaggcc caactcgcc acggactggc cggcgcgcg 1560

cgcggaagcgc cccgggggcac gctgctggtc accagcagcc ccgcccctgct gcggatcacc 1620  
gaccgggtgg tggatgatcgc cgacggccgg gtgaccgccc aggggacgca cgagcacctg 1680  
ctggccaccg acgcccgccta ccgcgaggag acaactgcggt ga 1722

<210> 82  
<211> 596  
<212> PRT  
<213> Micromonospora sp. strain 046-EC011

<400> 82

Val Thr Ala Asp Pro Arg Thr Ala Glu Pro Thr Arg Val Leu Leu Pro  
1 5 10 15  
Thr Ala Thr Ala Arg Arg Thr Trp Thr Thr Leu Gly Ala Glu Phe Arg  
20 25 30  
Arg Arg Pro Gly Leu Ser Ala Ala Ala Thr Ala Val Leu Val Ala Ala  
35 40 45  
Ala Thr Gly Gly Leu Val Ala Pro Trp Val Leu Gly Arg Leu Val Asp  
50 55 60  
Asp Val Ile Ala Asp Ala Pro Val Ser Arg Ile Ala Gly Arg Val Ala  
65 70 75 80  
Val Ile Ala Gly Ala Ala Val Leu Thr Gly Leu Leu Thr Ala Ala Gly  
85 90 95  
Ala Ala Leu Ala Ser Arg Leu Gly Glu Thr Val Leu Ala Arg Leu Arg  
100 105 110  
Glu Arg Val Leu Asp Arg Ala Leu His Leu Pro Ser Ala Thr Leu Glu  
115 120 125  
Arg Ala Gly Thr Gly Asp Leu Leu Ala Arg Val Gly Asp Asp Val Ala  
130 135 140  
Val Val Thr Asn Val Ile Ala Val Ser Gly Pro Ala Phe Val Gly Ala  
145 150 155 160  
Leu Leu Ser Val Val Leu Thr Val Phe Gly Leu Val Ala Leu Asp Trp  
165 170 175  
Arg Leu Gly Leu Ala Gly Leu Val Ala Ala Pro Ala Tyr Ala Leu Ala  
180 185 190  
Leu Arg Trp Tyr Leu Arg Arg Ser Ala Pro Tyr Tyr Ala Arg Glu Arg  
195 200 205  
Val Ala Thr Gly Glu Arg Thr Gln Ala Met Ala Gly Ala Leu Arg Gly  
210 215 220



Ala Ala Thr Val Arg Ala Tyr Arg Thr Glu Asp Ala His Val Ala Ala  
 225 230 235 240  
 Ile Ala Glu Arg Ser Gly Val Ala Arg Asp Leu Ser Leu Glu Ile Phe  
 245 250 255  
 Asn Leu His Thr Arg Phe Gly Leu Arg Ile Asn Arg Ser Glu Phe Leu  
 260 265 270  
 Gly Leu Ala Ala Val Leu Val Ala Gly Phe Phe Leu Val Arg Ala Asp  
 275 280 285  
 Leu Val Thr Val Gly Ala Ala Thr Thr Ala Ala Leu Tyr Phe His Arg  
 290 295 300  
 Leu Phe Asn Pro Ile Gly Leu Leu Leu Met Glu Ser Asp Ser Val Leu  
 305 310 315 320  
 Gln Ala Gly Ala Ser Leu Ala Arg Leu Val Gly Val Ala Thr Leu Pro  
 325 330 335  
 Asp Thr Ala Pro Ser Gly Pro Ala Pro Ser Ala Ala Gly Arg Arg Gly  
 340 345 350  
 Pro Ala Ala Leu Asp Val Thr Val Arg Arg His Arg Tyr Asp Asp Asp  
 355 360 365  
 Gly Pro Leu Val Leu Ala Asp Val Asp Leu Arg Leu Ala Pro Gly Glu  
 370 375 380  
 Arg Val Ala Leu Val Gly Ala Ser Gly Ala Gly Lys Ser Thr Leu Ala  
 385 390 395 400  
 Gly Ile Ala Ala Gly Ile Ile Ala Pro Thr Asp Gly Ser Val Arg Leu  
 405 410 415  
 Gly Gly Val Pro Leu Thr Glu Arg Gly Glu His Ala Val Arg Arg Asp  
 420 425 430  
 Val Ala Leu Val Ser Gln Glu Val His Val Phe Ala Gly Pro Leu Ala  
 435 440 445  
 Glu Asp Leu Arg Leu Ala Ala Pro Asp Ala Thr Asp Ala Glu Leu Leu  
 450 455 460  
 Asp Ala Leu Asp Arg Val Gly Ala Thr Thr Trp Leu Arg Ala Leu Pro  
 465 470 475 480  
 Asp Gly Leu Ala Thr Ala Val Gly Glu Gly Gly His Arg Leu Thr Ala  
 485 490 495  
 Ala Gln Ala Gln Gln Val Ala Leu Ala Arg Leu Val Leu Ala Ala Pro  
 500 505 510  
 Ala Val Ala Val Leu Asp Glu Ala Thr Ala Glu Ala Gly Ser Ala Gly  
 515 520 525

Ala Arg Asp Leu Asp Arg Ala Ala Leu Ala Ala Thr Glu Gly Arg Thr  
530 535 540

Thr Leu Ile Val Ala His Arg Leu Ser Gln Ala Val Ala Ala Asp Arg  
545 550 555 560

Ile Val Leu Leu Asp His Gly Arg Ile Val Glu Gln Gly Thr His Ser  
565 570 575

Glu Leu Leu Ala Ala Asp Gly Arg Tyr Gly His Leu Trp Arg Ser Trp  
580 585 590

Ser Val Pro Val  
595

<210> 83

<211> 1791

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 83

gtgaccgctg acccgcgctac cgccgaaccc acccgggtgt tgctgcccac cgcgaccgcc	60
cggcggacct ggacgacgct cggcgcgagg ttccgcccgc ggcccggcct cagcgccgcc	120
gcgaccgccg tgctcgctgc cgccgccacc ggcgggctgg tcgcccctg ggtgctcggc	180
cgcctcgctc acgacgtcat cgccgacgcc ccggtctccc ggatcgccgg ccgggtggcg	240
gtgatcgccg gcgcggcagt gctcaccgga ctgctcaccg ccgccggggc cgcgctcgcg	300
tcccgcctgg gggagacggt gctggcccgg ctgcgcgagc gggtcctcga ccgggagctg	360
cacctgccct cggcgacgct ggaacggggc ggcaccggcg acctgctggc ccgggtcggc	420
gacgacgtgg cggtggtgac gaacgtgatc gcggtcagcg gcccggcgtt cgtcggcgcg	480
ctgctgtccg tgggtgctgac cgtgttcggg ctggtcgcgc tcgactggcg gctcggcctc	540
gccgggctgg tcgccgcgc cgctacgcg ctggcgctgc gctggtacct gcgccggctg	600
gcgccgtact acgcccgcga gcgcgtcgcc accggcgagc ggacgcaggc gatggccggc	660
gcgctgcgtg gcgcggccac cgtgcgcgcg taccggaccg aggacgcga cgtcgcggcg	720
atcgccgagc gctccggcgt ggcgcgcgac ctgtcgctgg agatcttcaa cctgcacacc	780
cggttcgggc tgcggatcaa caggtcggag ttctcggcc tggccggcgt gctcgctgcc	840
gggttcttcc tggtcgcgc cgacctggc acagtggcg cggcgaccac cgccgcgctc	900
tacttccacc ggctgttcaa cccgatcggc ctgctgctga tggagtccga ctcgggtgctg	960
caggccggcg cgagcctcgc ccggctggc ggcgggcca cgctgccga caccgccccg	1020
tccgggcccc cgccgtcggc ggccggcgcg cgcgccccg cggcgctgga cgtcacggtc	1080

cgccggcacc gctacgacga cgacggccct ctggtcctgg cgcacgtcga cctgcgcctg 1140  
 gccccgggcg agcgggtcgc gctcgtgggc gccagcggcg cgggcaagag cacgctcgcc 1200  
 ggcacgcgcg ccgggatcat cgcgcccacc gacgggtcgg tacgcctggg cggcgtgccg 1260  
 ctgaccgagc ggggcgagca cgccgtgcgg cgcgacgtcg cgctggtcag ccaggagggtg 1320  
 cacgtcttcg ctggaccgct cgccgaggat ctgcgcctgg ctgccccgga cgccaccgac 1380  
 gccgaactgc tcgacgcgct ggaccgggtc ggcgccacca cctggctgcg cgcgctgccg 1440  
 gacgggctgg ccacagcggc cggcgagggc ggccaccggc tcaccgccgc gcaggcccag 1500  
 caggtcgccc tggcccggct ggtgctggcc gcgccgccg tcgccgtgct ggacgaggcc 1560  
 accgccgagg ccggcagcgc cggagcgcgt gacctggacc gggcggcgct ggccgccacc 1620  
 gagggacgga ccacgtgat cgtggcgcac cggtcagcc aggcggtcgc cgccgaccgg 1680  
 atcgtcctgc tcgaccacgg gcggatcgtg gagcagggca cgcactcgga actgctcgcc 1740  
 gccgacggcc ggtacgggca tctgtggcgc tcctggagcg tcccggtatg a 1791

<210> 84

<211> 507

<212> PRT

<213> Micromonospora sp. strain 046-EC011

<400> 84

Met Thr Asp Ala Pro Ala Arg Phe Val Leu Phe Pro Gly Arg His His  
 1 5 10 15

Leu Leu Thr Arg Phe Gln Ala Asp Tyr Leu Arg Arg Leu Ala Gly Asp  
 20 25 30

Asp Ala Thr Val Val Trp Ala Val Thr Ser Ala Asn His Glu Asn Thr  
 35 40 45

Arg Arg Asn Pro Val Pro Tyr His Arg Arg Glu Ala Ala Ile Glu Arg  
 50 55 60

Phe Ser Val Leu Ser Gly Leu Arg Ser Val Val Val Pro Ile Phe Asp  
 65 70 75 80

Thr Ala Tyr Thr Asp Ala Phe Ala Glu Val Thr Leu Lys Ser Ile Ala  
 85 90 95

Val Ala Thr Gly Leu Glu Leu Thr Pro Ala Asp Thr Val Leu Ala Cys  
 100 105 110

Ser Thr Pro Glu Val Ala Lys Leu Tyr Glu Gln Leu Gly Phe Ser Ile  
 115 120 125

Ala Pro Val Glu Ala Asp Pro Asp Leu Pro Glu Pro Pro Glu Arg Pro

130	135	140
Trp Asp Val Leu Leu Arg Leu Ala Ala Gly Asp Glu Thr Trp Arg Ala 145 150 155 160		
Leu Thr His Pro Ala Thr Ile Asp Val Phe Glu Arg Tyr Arg Leu Val 165 170 175		
Glu Ser Ile Arg Ser Val Val Asn Asp Pro Leu Val Gly Asp Glu Gly 180 185 190		
Gly Leu Thr Val Thr Arg Asp Tyr Arg Thr Tyr Val Glu Ala Phe Ala 195 200 205		
Thr Ala Ala Gln Arg Lys Trp Asp Ser Val Arg Arg Tyr Val Gln Pro 210 215 220		
Gly Arg Ile Val Asp Ile Gly Cys Gly Ala Gly Ala Val Leu Glu Leu 225 230 235 240		
Ala Asp Arg Glu Ala Ala Leu Arg Glu Ser Asp Leu Ile Gly Val Glu 245 250 255		
Val Ala Arg His Leu Tyr Gln Glu Cys Leu His Lys Lys Ala Gln Gly 260 265 270		
Val Phe Arg Asn Ala Asn Val Tyr Phe Phe His Arg Asn Val Leu Gly 275 280 285		
Gly Ala Val Phe Lys Asp Arg Ser Val Asp Thr Thr Leu Thr Phe Ala 290 295 300		
Leu Thr His Glu Ile Trp Ser Tyr Gly Arg Arg Arg Glu Ser Leu Leu 305 310 315 320		
Gln Phe Ala Arg Arg Ile His Asp His Thr Val Pro Gly Gly Val Trp 325 330 335		
Ile Asn Ser Asp Val Cys Gly Pro Asp Asp Pro Arg Arg Gln Val Leu 340 345 350		
Leu Arg Leu Ser Thr Asp Asp Gly Asp Asn Pro Ala Ala Pro Arg Pro 355 360 365		
Asp Leu Ala Glu Leu Thr Ser Ala Glu Val Arg Arg Tyr Val Gly Gly 370 375 380		
Leu Ser Thr Arg Ala Arg Leu Asp Gln Phe Ala Val Asp Phe Ala Phe 385 390 395 400		
Asp Phe Asp Tyr Glu Pro Leu Pro Asp Gly Ala Val Arg Leu Thr Leu 405 410 415		
Gly Ala Ala Met Asp Tyr Leu Thr Arg Lys Asp Tyr Thr Asp Asn Trp 420 425 430		
Leu Ser Glu Thr Gln Glu Gln Phe Cys Gly Leu Ser Phe Ala Asp Trp		

435	440	445
Thr Asp Leu Leu Thr Glu Ala Gly Phe Glu Ile Gly Pro Ala Ser Ala		
450	455	460
Pro Val Arg Asn Glu Trp Val Ile Asp Asn Arg Ile Ala Pro Val Ala		
465	470	475
Ser Leu Thr Asp Leu Asp Gly Arg Pro Leu Asp Trp Pro Thr Thr His		
485	490	495
Val Leu Thr Val Ala His Arg Pro Arg Asn Gln		
500	505	

<210> 85  
 <211> 1524  
 <212> DNA  
 <213> Micromonospora sp. strain 046-EC011

<400> 85  
 atgaccgacg cgccggcccg cttcgtgctc ttcccggggc ggcaccacct gctgaccgcg 60  
 ttccaggccg actacctgcg gcggctggcc ggggacgacg ccacagtggc ctgggcggtg 120  
 acgtcggcca accacgagaa caccaggcgc aacccggtgc cctaccaccg gcgggaggcc 180  
 gcgatcgaac gattcagcgt gctgagcggg ctgcgctcgg tgggtggcgcc gatcttcgac 240  
 accgcgtaca ccgacgcgtt cgccgaggtg acgctgaagt ccatcgcggt ggccaccggg 300  
 ctcgaactca ccccgccga caccgtgctg gcctgctcca cgccggaggt cggaagctg 360  
 tacgagcagc tcggcttttc gatcgcgccg gtcgaggcgg acccgacct gcccgagccg 420  
 cccgaacggc cgtgggacgt gctgctgcgc ctggccgccc gggacgagac ctggcgcgcg 480  
 ctcacccacc cggccaccat cgacgtgttc gagcgctacc gcctggtcga gtcgatccgg 540  
 tcggtggtga acgaccgct cgtcggcgac gaggcggtc tcacagtac ccgcgactac 600  
 cggacctacg tcgaggcgtt cgccacggcc gcgcagcgca agtgggactc ggtacgccgg 660  
 tacgtgcagc ccggccgcat cgtggacatc ggctgcggcg cgggcgccgt cctggaactc 720  
 gccgaccggg aggccgcgct gcgtgagagc gacctgatcg gcgtggaggt cgcccgccac 780  
 ctctaccagg agtgctgca caagaaggcg caggcgctgt tccgcaacgc caacgtctac 840  
 ttcttccacc gcaacgtcct cgggcgcgcg gtgttcaagg accgctcggt cgacaccacg 900  
 ctcacgttcg cgctgaccca cgagatctgg tcgtacgggc ggcggcggga gtcgctgctg 960  
 cagttcgccc gccgcatcca cgaccacagc gtgcccggcg gcgtctggat caacagcgac 1020  
 gtgtgcggtc cggacgaccc ccggcggcag gtgctcctgc gactgtccac cgacgacggc 1080  
 gacaacccgg ccgcgccccg ccccgacctc gccgagctga cctcggcgga ggtccggcgt 1140

tacgtcggcg ggctgtcgac gcgggcgcgg ctggaccagt tcgccgtcga cttcgcgttc 1200  
gacttcgact acgagccgct ccccgacggc gcggtacgcc tgacgctggg cgccgcgatg 1260  
gactacctga cccgcaagga ctacacggac aactggctgt cggagacgca ggagcagttc 1320  
tgccggcctga gcttcgccga ctggacggac ctgctcaccg aggcgggggtt cgagatcggc 1380  
ccggcgctcg cgccggtgcg caacgagtgg gtgatcgaca accggatcgc gccagtccgc 1440  
tccctcaccg acctcgacgg ccggccgctg gactggccga ccaccacgt cctcaccgtc 1500  
gcccaccgcc cccgcaacca gtga 1524

<210> 86

<211> 232

<212> PRT

<213> Micromonospora sp. strain 046-EC011

<400> 86

Val Ser Asp Ile Gln Ile Ile Ser Phe Val Ala Ala Ser Leu Leu Ile  
1 5 10 15

Ile Ile Val Pro Gly Val Asp Phe Ala Leu Val Thr Arg Gln Thr Val  
20 25 30

Arg Tyr Gly Arg Arg Ala Gly Phe Val Val Leu Ala Gly Leu Phe Val  
35 40 45

Ala Ala Leu Val His Ala Ser Phe Ala Thr Ala Gly Leu Ser Ala Leu  
50 55 60

Leu Val Ser Ser Pro Thr Leu Tyr Thr Val Leu Arg Val Ala Gly Ala  
65 70 75 80

Leu Tyr Leu Leu Tyr Leu Gly Gly Thr Ile Leu Trp Ala Thr Arg Pro  
85 90 95

Arg Arg Thr Val Pro Ala Ala Gln Pro Val Thr Val Gly Ala Gly Gly  
100 105 110

Ala Gly Pro Asp Thr Asp Thr Gly Pro Ala Pro Val Pro Asp Thr Pro  
115 120 125

Ala Ala Asp Glu Pro His Val Ala Arg Arg Ser Phe Val Met Gly Val  
130 135 140

Thr Ser Gln Leu Leu Asn Val Lys Val Val Val Phe Tyr Val Ser Phe  
145 150 155 160

Val Pro Gln Phe Val Lys Pro Gly Glu Gly Ala Ala Ala Arg Thr Ala  
165 170 175

Val Leu Ala Ala Thr Phe Ile Gly Leu Ala Val Leu Trp Trp Ala Cys

180                      185                      190  
 Tyr Ile Met Leu Ile Asp Arg Leu Gln Pro Trp Leu Thr Arg Pro Ser  
       195                      200                      205  
 Val Leu Leu Val Ile Glu Arg Leu Thr Gly Leu Ile Leu Ile Val Leu  
       210                      215                      220  
 Ala Ile Arg Ile Ala Leu Ser Arg  
       225                      230

<210> 87  
 <211> 699  
 <212> DNA  
 <213> Micromonospora sp. strain 046-EC011

<400> 87  
 gtgtctgaca tccagatcat cagtttcgtc gccgccagcc tgetcatcat catcgtgccg 60  
 ggcgtcgact tcgcgctcgt caccggcgag accgtcaggt acggccggcg ggccgggttc 120  
 gtggtgctgg cggggtgtt cgtcgccgcg ctggtgcacg cgtcgttcgc gaccgccggc 180  
 ctgtccgccc tgctggtctc ctcgccgacg ctctacacgg tgctgcgcgt cgccggcgcg 240  
 ctgtacctgc tctacctggg cggcacgacg ctctgggcca cccggccgcg ccggacggtc 300  
 ccggcggcgc agccggtcac tgtcggcgcg ggccggcgcc ggccggacac ggacaccggc 360  
 cccgcgcggg tgccggacac cccggccgcc gacgagccgc acgtggcccg ccgctcgttc 420  
 gtcattggcg tcaccagcca gctgctgaac gtcaaggtgg tcgtcttcta cgtctcgttc 480  
 gtgccgcagt tcgtcaagcc cggcgagggg gcgccggccc gtacggcggt gtcgcccgcc 540  
 acgttcacgc gcctcgcggt gctctggtgg gcctgtaca tcatgctcat cgacagggtg 600  
 cagccctggc tgaccgggcc gtccgtgctg ctggtgatcg aacggctgac cgggctcatc 660  
 ctgatcgtcc tggcgatccg gatcgcgctg agccggtga 699

<210> 88  
 <211> 132  
 <212> PRT  
 <213> Micromonospora sp. strain 046-EC011

<400> 88

Val Gly Val Ser Ala Met Thr Thr Phe Asp Tyr Asp Gly Arg Val Phe  
 1                      5                      10                      15

Val Ser Val Asp His Asp Ala Gly Asp Gly Ala Glu Pro Leu Arg Gly  
       20                      25                      30

His Tyr His Gln Arg Gly Asp Leu Val Trp Ala Glu Ile Thr Gly Gly  
       35                      40                      45

Pro Val Arg His Gly Arg Leu Ala Gly Thr Cys Asp Ala Gln Gly Val  
50 55 60

Val Arg Phe Ala Tyr Leu Glu Val Leu Thr Asp Gly Thr Ile Val Ile  
65 70 75 80

Gly Glu Cys Glu Ser Arg Pro Glu Arg Leu Pro Asp Gly Arg Ile Arg  
85 90 95

Leu Arg Glu Gln Trp Arg Arg His Gly Pro Arg Gln Asp Ser Gly Val  
100 105 110

Ser Val Ile Glu Glu Ala Val Pro Ala Leu Ala Gly Gly Gln Glu Ser  
115 120 125

Arg Arg Arg Val  
130

<210> 89

<211> 399

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 89

gtgggctga ggcgatgac gacattcgac tacgacggcc gcgtcttcgt ctcggtggac 60

cacgacgcc gtgacggcgc cgagccgctg cgggggcaact accaccagcg tggcgacctg 120

gtctgggagg agatcaccgg cggcccgggc cggcacggcc ggctggccgg cacctgcgac 180

gcgcagggcg tcgtgcgctt cgcctacctg gaggtgctca ccgacggcac catagtcac 240

ggcgagtgcg agtcccggcc cgaacggctg ccggacggcc ggatccggct gcgggaacag 300

tggcgccggc acggaccacg ccaggacagc ggctgtctccg tcatcgagga ggcagtgccg 360

gcgctcgccg gaggacagga gagccggcgt cgtgtctga 399